Organic Gardening

GARDENING WITHOUT THE USE OF CHEMICALS

JAN. 1948

25 Cents

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Organic Gardening

VOLUME 12
NUMBER 1

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GARDEN GUIDE

Here is a list of some of the things to be found in the new 1948 Short Guide of Kelsey Nursery Service. Copy free on request (except 25c west of Iowa). Will be ready in late February—but write NOW!

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P. S.—*Confidential to readers of Organic Gardening—(other folks don't seem to care)—Our Yews have been grown strictly organically, because we found they grow best that way. Rhododendrons come out of natural humus. Fruit stocks are grown first two years in rich humus only—what a difference! On page 20 of catalog you'll find rare shrubs and evergreens grown organically only.*

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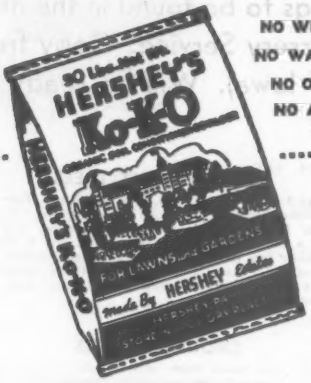

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FOR LAWNS AND GARDENS

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- Mix in the Compost Heap
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HERSHEY ESTATES

HERSHEY, PENNSYLVANIA

ORGANIC FOODS MYSTIFY ALL BUT THE GROWER

October 6, 1947

"In our summer community in Maine," wrote a reader of the Organic Gardening magazine a few weeks ago, "one minister's family used to leave vegetables in a box and anyone who wanted them would put what they were worth in a jar to be sent to Europe to help feed the needy. One day we filled the box with organically grown tomatoes without telling anyone. In a few days the family who bought them told the minister who had put up the box that they had never tasted such wonderful tomatoes. The minister was as mystified as the buyer until we came along and explained that the tomatoes were especially good because they were raised without any chemicals."

—o—

ORGANIC METHODS FOR THE FARM

October 8, 1947

If you would accept an humble constructive suggestion, I would say that I believe that Organic Gardening could accomplish greater results if it stressed more aggressively the matter of organic fertility of the large farm by disking in green manure. More of this seems to be done now and in recent years than formerly but there is much to be done still if the ground is to be sufficiently prepared for good tilth. This practice would make the shot in the arm (application of artificial chemicals) unnecessary.

Also I think it would be helpful to review about three methods of compost making in a bit more definite manner, with special emphasis on heating, time and manner of inserting

What Will Your Garden Grow This Year?

Prize Roses? Tastier, More Healthful Vegetables and Fruit? Velvety-turf lawns?

It will—only if you build up soil organically and feed plants the proper food. Organically-fed plants suffer less insect and disease damage, too. Shrubs grow thicker; have better color.

The only **low-cost, sure** way to build better soil **faster** is with bushels and bushels of compost . . . . and you can make quantities of rich, activated compost **quicker** with **ActivO,** an unusual bacterial discovery that speeds decomposition amazingly (no manure needed) and permits you to use such rich materials as **garbage . . . . actually reduces garbage without odor . . . . gives compost fertilizer in 2 to 6 weeks!** Works any month of year. NOW IS THE TIME TO START.

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SPECIAL: **If already an ActivO user and your local dealer hasn't the additional ActivO you need, take advantage of this offer: One No. 25 size unit of ActivO, for 3½ tons compost, and an 80 lb. bag of special pulverized compost limestone—BOTH for $6.70, shipped freight collect. Check and clip this offer, and mail with coupon below.**

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"CUT GERMINATION TIME BY 2/3"
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earthworms to turn the heap, the amount of moisture to add, the purpose of the ventilators, and other such details. It would be well also to mention the substitutes for manure.

—o—

TIN CANS FOR COMPOST

September 12, 1947

I am a born composter. Burn the tin cans and put them on the pile.

A. C. Clavel,
Wauchula, Florida.

—o—

GARDEN CLUB DEFENDS PUBLIC RIGHTS

October 24, 1947

I belong to a garden club, the Edgewood Club, which is limited to 20 members, but it is my wish to educate each of them to the compost way of gardening. I practiced this method for many years but, I believe, I have made the mistake in using chemical fertilizers as well. Now I wish to correct my mistakes.

Would you be interested in knowing that through a protest I wrote for our garden club, the garden incinerator ordinance that our councilmen were planning to pass was thrown out and a completely new one written? One section read that if one were to "throw, burn, bury on either private or public premises such combustible materials as tree cuttings, hedge clippings, and burnable materials of similar nature, he would be convicted of a misdemeanor and would be fined a sum not to exceed $50.00". Not one person in our club had taken the trouble to read the ordinance, and I realized at once that if it were passed, we would be forbidden to build our compost piles. I also pointed out to them that it would be working against conservation and every law of nature, as we decided to protest it. The resultant publicity given my protest in our daily and weekly papers brought out the largest crowd ever to protest anything at a council meeting. Both reporters told me that they believed our club

had done a great thing for our town, so we feel justly proud.

Mrs. Harold E. Dannemiller,
123-25th Street, N. W.,
Barberton, Ohio.

—o—

ORGANIC FOODS IN BERKS COUNTY

October 1, 1947

According to the New York Post for September 20, 1947 leather experts and handbag designers Elizabeth and William Phelps liked Joanna Furnace in Berks County, Pennsylvania so well, that they decided to establish a home there. Little by little they are moving themselves and their business and business associates to Joanna Furnace. At their country home they grow fruits and vegetables—extra good, they insist because they do not believe in using chemicals on them.

—o—

CHERRY TREE RESPONDS TO NATURAL COMPOST

Aug. 23, 1947

This spring I planted a new orchard in ground that had been in buck brush and wild bushes. The trees seemed to reach for the sun instead of branching out. Most of the trees grew 18 inches or more in height since they were planted on May 15.

I want to tell you about a Stark's Gold Cherry tree that has stood head and shoulders above all other trees in

June Rockhill STRAWBERRIES

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No. 1 size (for Compost Cabinet) $2.40 (doz.)
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No. 7 size (treats up to 1800 lbs. waste) $2.00
No. 25 size (treats 3 tons waste) $6.79

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2 containers $2.50; ½ Gallon $6.00; 1 Gallon $11.00

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100 lb. bag $2.50; Ton $30.80 F. O. B. Townsend

SPECIAL COMBINATION

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JOSEPH HARRIS COMPANY, INC.

53 MORETON FARM — ROCHESTER 11, N. Y.

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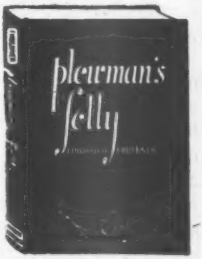
By

E. H. Faulkner



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the orchard. When digging the hole for this particular tree I ran into an old tree stump which was partially decayed. It was an immense stump, so I thought it wouldn't hurt a thing to just leave it right where it was. I planted the cherry tree right on top of this large stump. This tree started to put out leaves immediately and the leaves are so big and so brightly colored that it is a pleasure to look at them. Since May this tree has grown two feet in height while other trees in the same row either failed to grow at all or put out a few leaves which later fell off and now a few leaves are appearing at the bottom of the stem.

From this observation I assume that the partially decayed tree stump made a perfect starting food for the roots of the cherry tree that was planted on it, whereas the other trees lacked a starter so that it was difficult or quite impossible for them to get started.

Gerald H. Smith,
Spirit Lake, Idaho.

—o—

ORCHARD SPRAYS KILL COWS

May 28, 1947.

I am trying to form a Garden Club for the study and practice of organic gardening. Just recently a farm owner of our county got some quick results from spraying. He set some men to

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work spraying his orchard. They had some spray left over after killing all the insects, bad worms, and bugs so they poured the remainder on the ground in the orchard. In a few hours he had three dead cows and one very sick cow. I am enclosing a clipping from a local newspaper about a young man who drank the spray his mother had made for her plants. This young man died in the Millersburg hospital yesterday. I am glad some have the sense to speak out against this foolish work.

Lewis Clement Hall,
1827 West Main - Rt. No. 5,
Newark, Ohio.

—o—

CHEMICAL FERTILIZERS INADEQUATE

November 30, 1946

While I am writing this, please let me thank you for the pleasure your magazine has given me. I do not have the opportunity to put any of the fine organic gardening practices into use, but I read all of every issue, and really believe you "have something on the ball". And this comes to one whose company handles over 3,000 tons of chemical fertilizers each year! Some day we hope to produce some organic plant foods, using the tremendous refuse from our cotton gin, and also from our commercial seed cleaning

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plant. I believe we are passing up a great opportunity in not making use of this material, not to mention the good it would undoubtedly do the soil. With good wishes for a great deal of success in all your organic gardening efforts.

M. C. Dew,
Raeford, N. C.

—o—

CHEMICALS FATAL TO EARTHWORMS

April 25, 1947

With great interest I read the article "Soil Aggregates made by Earthworms" in your October issue. Since I started the method of making compost, I noticed a tremendous increase of earthworms in my soil. To the beds, where compost was added last spring, I soon observed a countless number of small hills, a form of black, fine coarse soil, indications of great activities below the surface. Of course I always had worms in my gardens, but not in such a great quantity since applying compost to the soil.

One morning strolling through my garden, I found to my distress a great number of earthworms all dead, laying on the surface of one of the new beds. These worms looked as though they had eaten poison. Later in the day, I found out that my helper had mixed the soil with commercial fertilizer the night before. I knew there was only a small amount of commercial fertilizer in store, but it was sufficient to kill a great number of worms in a bed 4 feet by 80 feet long.

Since this incident occurred, there will be no more commercial fertilizer used in my garden; the result in growing my Delphiniums with compost has been far over my expectation.

Jack Offerman,
4709 W. Stevens,
Seattle 6, Wash.
Western Vice-President of the
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The Organiculturist's Creed

ORGANICULTURE is a vigorous and growing movement, one that is destined to alter our conceptions of the farm and the garden and to revolutionize our methods of operating them in order to secure for ourselves and others more abundant and more perfect food. The seed sown by Sir Albert Howard is beginning to bloom lustily and with such vim that it is already thriving and propagating of its own strength. Composters by the hundreds are telling their neighboring countrymen of the wonders of this "new," yet age-old method, and the latter are listening by the thousands. Compost heaps are becoming an integral part of the farm, the garden, and the landscape. Organiculture is here to stay. When one sees its astounding results as developed under his own hand, he says a quick and unreluctant good-bye to the groping and artificial test-tube methods of yesterday.

It may be advisable at this point to define the organic method in detail and to illustrate individually its precepts, for the benefit of newcomers, for the approval of seasoned veterans, and for the possible conversion of scoffers and sceptics, some of whom attack it without knowing exactly what they are futilely endeavoring to combat.

Sometimes a chemist takes us to task and criticizes the inclusion of certain items in the organic arsenal of weapons. For example, he calls lime a chemical, yet we advocate its presence in the compost heap. Of course lime is a chemical! So is everything else. There is nitrogen, phosphorous, and potash in your table cloth, in ham and eggs, and in your very own mother-in-law. So it is high time for us and our adversaries to stop talking in elusive generalities and to start clarifying our specific points.

In regard to the word "organic," Webster says "pertaining to, or derived from living organisms." On the other hand—also according to Webster—when a chemist refers to the word "organic" he means "pertaining to or designating that branch of chemistry which treats of the compounds of carbon." It can be seen, therefore, that when we say "organic" we mean something different from what the chemist understands by that word, but these are mere technicalities resulting from professionalized word-usage. We do not exclude a chemical simply because it is a chemical any more than we include an organism just because it is an organism. There are, however, some chemicals and some bacteria that try to upset everything that the organiculturist is attempting to achieve. *Those* saboteurs are the ones against which we discriminate.

The first tenet of our organiculturist's creed is that we are opposed to artificial or chemical fertilizers. We decry these chemical fertilizers because they contain certain poisonous

elements in too great a concentration. All the chemicals present in these artificial fertilizers are also distributed in ocean waters, but the quantities are so exceedingly negligible that fish can safely swim in such a medium though they could never flip a fin in the concentrations of such chemicals that are found in chemical fertilizers. Certain indispensable soil microorganisms that are essential to the processes of plant growth can tolerate these excessive concentrations no better than the fish could endure their presence in salt water. We can use the elements contained in chemical fertilizers, regardless of whether they are organic or inorganic, but only if they are in extremely minute distribution. Such safe distribution can be found in certain rocks that can be pulverized for fertilizer use, but the subject still requires a great deal of research and experimentation, a project which the *Soil and Health Foundation* may soon undertake. The supply of such rock materials is enormous and cheap, and recent experimental work has already demonstrated that, if ground fine enough, they become a quick-acting fertilizer. Many rocks contain plant nutrients in considerable amounts which are insoluble until they are pulverized and brought into contact with the soil when they are rendered soluble by carbonic acid and other substances in the soil. Meanwhile, however, better results can be obtained if the chemicals we use are in organic form.

Besides compost made of plant and animal matter, the organiculturist may employ as fertilizers such substances as raw phosphate rock, dolomite, ground oyster shells, and miscellaneous ground rocks such as granite dusts and pulverized limestone. Quicklime, on the other hand, is much too strong in action and will destroy bacteria. Builders' hydrated (slaked) lime, though stronger than the simple pulverized limestone, can be used if the latter is not available. Even wood ashes may be used as a substitute for lime in making compost. All of the above are chemicals, but they are the kind that can be tolerated in relatively large quantities.

Phosphorous and calcium (the latter found abundantly in lime) are not as dangerous substances as potash, which is a catalyst and is required in small applications only. Too much of it interferes with the growing processes of the plant, which is, however, as intemperate as a drunkard in its thirst for potash. It can't resist it! There is a current medical theory that regions in which the land is overly rich in potash show an unusually high incidence of human cancer.

Another tenet of the organiculturists holds to the making of compost by Sir Albert Howard's Indore process, involving the ratio of one part animal matter to three parts of plant residue, a relationship which is found naturally in field and forest. Many persons mistakenly consider themselves as practicing organiculture if they simply use manure, which is in itself an unbalanced fertilizer. It does, to be sure, contain many valuable elements, including vitamines and hormones, but inasmuch as plants and especially leaves are extremely rich in mineral elements, we ought to use both plant and animal matter. Where manure alone is used it must be well-rotted. The same applies to green matter which should be rotted through the compost heap. The application of raw green matter and manure is a severe shock to the soil until its organisms can bring about their decay. Eventually it will benefit, but in the meantime the current crop will suffer.

The organic farmer and gardener must realize that fertilization is not the only measure for success. He must treat the soil as a living, breathing entity. He must rotate crops. He must fallow the land at regulated intervals. The organiculturist must not practice one-crop monoculture but must engage in a balanced agriculture with cattle as part of the general program. He must be smart in the ways of the soil and crops, observing the reaction of the land to the actions of

man. For instance, he must know when to plant and when to harvest and what varieties of seed to use. Compost alone does not make a successful gardener any more than does gardening without compost.

The organic farmer observes the Law of Return, restoring to the soil all plant residues that came from it. He does not burn leaves, spoiled hay, or other crop by-products, but often goes out of his way to retrieve organic matter that others throw away. He is against the operation of hundred thousand acre farm-factories where all the basic principles of organic farming are violated or ignored. The organiculturist believes also that infertile soils should be set aside for the growing of chemurgic crops only, that is, non-food crops such as cloth for clothes, corn for production of wood alcohol, and similar commodities.

The use of poison sprays in orchards and on farm crops is taboo, for there is definite evidence to confirm the fact that the strengthening of a plant or tree by the use of composts makes that plant or tree much less susceptible to infestation by insects or disease than does recourse to sprays. Recent controlled experiments with aphids in the United States Government Agricultural Stations showed that the more chemical fertilizers were used, the more attractive plants, thus grown, became to the aphids. The organiculturist fervently believes that even on a commercial scale orcharding can eventually eliminate all dependence on poison sprays.

The use of coal ashes in the garden is unwise, as they contain the strong element ammonium sulphate, which is also found in chimney soot. The treating of seeds with antiseptic poisons for the purpose of killing off disease organisms is likewise injudicious, for such poisons are absorbed into the seed.

We are not in favor of using human excrement or sewage sludge which stems from it, on food crops. If it is composted separately it could be used on lawns and ornamentals. It should never be used unless thoroughly composted. To accomplish this sludge must first be thoroughly pulverized. We believe there is a sufficiency of green matter available now. If the problem becomes more acute later, the whole problem of the use of human excrement must be investigated thoroughly.

The organiculturist farmer must realize that in him is placed a sacred trust, the task of producing food that will impart health to the people who consume it. As a patriotic duty he assumes an obligation to preserve the fertility of the soil, a precious heritage that he must pass on, undefiled and even enriched, to subsequent generations.

Biological Control of Cucumber Beetle

A reader finds that the cucumber beetle is repelled by radishes, according to his consistent experience. This is well worth trying, especially by newcomers to the organic method.

The Water Hyacinth as a Purifier of Sewage Effluent

By the late
SIR ALBERT HOWARD

IN the disposal of sewage, it is necessary to borrow a large volume of water from our rivers for transporting the wastes of the population to the sewage works. During the various processes of sewage purification most of the potash and a good deal of the combined nitrogen and phosphate is carried away in the clear effluent and lost to the land which produced it.

Can these vast supplies of potash and other salts be reclaimed? Does Nature, in our water plants, provide the means? It would appear so. One of these plants—the water hyacinth—can not only recover these valuable salts, but can at the same time aerate the water and even render it unsuitable for the breeding of mosquitoes. I discovered this fact in Assam in 1937. On the islands among the rice, in which water hyacinth is plentiful, it is possible to sleep out of doors during the autumn duck-shooting season without a mosquito net and without getting an attack of malaria. The water hyacinth appears to possess the power of rendering water unsuitable for the breeding of the malaria mosquito, an interesting point which seems to have escaped the attention of our malariologists.

I should like to devote some attention to the way the water hyacinth deals with the dissolved salts in surface drainage water and water polluted by sewage. The results obtained come from India and South Africa.

The water hyacinth is a plant which floats on the surface of streams and rivers by means of the air bladders in the leaf bases and is propagated vegetatively with great speed. Soon the plant chokes rivers and canals and impedes navigation. For this reason the water hyacinth is looked upon in the United States as a serious pest. In the Mississippi valley and in Florida, for example, large sums are spent every year to keep open navigable channels. In the Gangetic delta the water hyacinth has developed so rapidly as not only to impede navigation, but to interfere with the cultivation of deep-water rice. It is looked upon as a serious pest in Bengal.

In India in the nineteen twenties it occurred to me that the water hyacinth ought to be regarded not as a pest to be destroyed, but as a heaven-sent gift of Providence, and that this plant should be composted (with the help of urine earth from under the cattle) for the benefit of the rice crop. At first no notice was taken of this suggestion, but after a time some careful composting trials were carried out by Mr. E. F. Watson, O.B.E., the Superintendent of the Governor's Estates, Bengal, in the grounds of Government House at Barrackpore. Excellent compost was made and the results were published. Soon some of the pioneers among the tea planters in Assam began to collect the water hyacinth from the low-lying areas under

rice, adjoining the tea, and to use it as a constituent of their large compost heaps. In 1937 during a tour in Assam I saw several thousands of tons of compost in which this weed was one of the chief constituents. The Indian cultivators were beginning to copy the tea estates; the value of the water hyacinth in composting was thus proved by the one unanswerable argument—success. This result depended on two facts—the high percentage of potash and the amount of moisture in the partially withered plant—which renders the watering of the compost heaps unnecessary.

A little consideration will explain why the water hyacinth grows so well in a country like Bengal, where water-borne sewage has only been adopted in the large cities. In the country-side there is no modern sanitation: the wastes of the population are deposited on the ground in the neighbourhood of the villages. During the rainy season a large portion of the soluble salts resulting from the fermentation of these wastes is certain to find its way into the streams and rivers. The water hyacinth makes use of these salts, potash in particular, and converts them into organic matter.

The subject of the final purification of sewage effluent rested at this point till 1945, when the Auckland Drainage Scheme came up for discussion. It was proposed to discharge the crude sewage of the city and the storm water into the sea. The urban population had, however, been made compost-minded by the phenomenal success of the New Zealand Compost Club; the danger of contamination of the bathing beaches near the city was evident: a Drainage League was formed which strongly opposed the new sewage disposal scheme and urged that the wastes of the city should be composted and returned to the land, which so sorely needs them. My opinion was asked and full details of the local conditions were supplied to me.

I suggested that a new type of sewage disposal plant should be devised for Auckland which would combine: (1) the production of methane and activated and digested sludge on the lines of the Mogden works near Isleworth; (2) the production and sale of dewatered sludge similar to that made at Dartford; (3) the removal of the soluble salts in the effluent by means of the water hyacinth, and (4) the manufacture and sale of compost made from town wastes, water hyacinth, and a portion of the dried sewage sludge. One result has been that the original sewage scheme is likely to be held up pending the report of a Royal Commission on the whole subject of sewage disposal in New Zealand.

While these Auckland discussions were under way, the question of sewage disposal arose in one of the chief cities of South Africa. I suggested to a colleague there that he should use his long experience as a technical chemist to look into the possibilities of the water hyacinth for purifying sewage effluent so that practically pure water could be returned to the streams and rivers, or used for irrigation. I have now received a full report on this South African work and permission to use the results. As they are likely to be of interest in Great Britain in pointing the way to the last stage in sewage purification, the following summary of Mr. Dymond's results is included in this paper.

The chemical composition of this weed as obtained from one of the South African rivers, now choked with this pest, is as follows. The plant contains 93.4 per cent of water and 6.6 per cent of dry matter, of which 76.10 per cent is organic matter, 23.90 per cent ash. The nitrogen content of this dry matter is 2 per cent. The analysis of the ash is as follows:—

Insoluble residue	39.1 per cent.
Lime	8.5 per cent.
Magnesia	5.6 per cent.
Phosphoric oxide (P_2O_5)	4.0 per cent.
Potash	11.2 per cent.

In terms of dry plant, one ton was found to contain 40.2 lb. of nitrogen, 19.1 lb. of (P_2O_5) and 53.5 lb. of K_2O.

To ascertain the power of this water plant to absorb dissolved salts, a comparison was made between the composition of plants grown in polluted river water and in the same polluted river water plus the salts ordinarily used in water culture. The results were:—

	Polluted River Water	*Polluted River Water plus Water Culture Salts*
Water	94.1	95.5
Dry matter	5.9	4.5
Organic content of dry matter	66.0	70.7
Ash	34.0	29.3
Nitrogen	1.42	2.23
Analysis of the Ash		
Lime	6.8	8.0
Magnesia	4.8	5.0
Phosphoric oxide	2.0	8.0
Potash	7.4	11.6

In the short period of fourteen days the nitrogen rose from 1.42 to 2.23 per cent, the phosphoric oxide from 2.0 to 8.0 per cent, and the potash from 7.4 to 11.6 per cent. These figures confirm the great power of this water weed to remove dissolved salts.

It was found in these South African trials that there are about 96 tons of plants per acre, that the rate of reproduction in the summer months was 100 per cent per month, that one acre will yield a very large quantity of dry matter every year. My correspondent calculated that every acre will produce 2,415.6 lb. of organic nitrogen a year, valued at £177.6; 1,917 lb. of organic P_2O_5 worth £38.4; and 3,300 lb. of organic potash valued at £59.1—a total of £275.1. He considers that a city of 200,000 people would need 900 acres of water hyacinth which would yield 1,398 tons of organic nitrogen, worth £205,000. Add the phosphoric oxide and potash values, and we have a total potential source of new revenue from 200,000 persons of £341,800 every year. These figures take no account of humus value, lime, and other salts present in the plant.

These preliminary indications which, of course, must be confirmed by large-scale tests, suggest that the water hyacinth in regions which suit this plant will prove of considerable economic value to civilization in providing the means of trapping the vast amounts of fertile elements at present lost in sewage effluent. They suggest that preliminary experiments should be conducted in Great Britain with the water plants of temporate regions like watercress to ascertain whether these South African results can be applied to this country. As is well known, large sums are devoted every year to the purchase of imported inorganic phosphates and potash for the land. It may well be that a portion of this expenditure will be unnecessary in the future and that some of these elements might be better obtained in organic form from our sewage effluents by the help of suitable water plants. If this proves to be the case, the last stage in the utilization of sewage will have been reached. The water borrowed for transport can then be returned to our streams and rivers in a much purer condition than it was originally.

What are we to do with the crop of water plants? This depends on the species and on the freedom from harmful bacteria of the water in which they are grown. The obvious method is to compost them with dried sewage sludge and then to sell the compost. Later, when mankind frees itself from the thraldom imposed by fear of disease, they might even be used as food.

Bloodroot in an April woods. McFarland

BLOODROOT

(Sanguinaria canadensis)

By DR. WILLIAM H. EYSTER

BLOODROOT is a common member of the poppy family, and gets its name from its red, blood-like sap. It prefers to grow in rich woods and borders in which it often appears at the first sign of spring. It makes its appearance so early in the spring that often there are still patches of snow on the shaded sides of rocks and on the northern exposures of ravines.

The plant's solitary flower and single leaf are rolled together and enclosed in a protective sheath which forms a sort of tubular passage way up through the soil and its overlying leaf mulch. As soon as the leaf and flower bud emerge from the sheath, the much-lobed, heart-shaped leaf blade unrolls itself in such a way as to expose the flower stalk and its terminal flower bud. The flower stalk elongates and carries the enlarging bud above the leaf where it opens and exposes the sex organs to the insects which accomplish cross pollination. Like all poppy flowers, the sepals of the bloodroot flower are discarded when it opens in much the same way as one might discard an outer cloak in order to more completely enjoy the early spring sunshine. A series of sunny, warm, spring days accentuates

the transitory nature of bloodroot. The flowers come and go so quickly that one can say with a good deal of accuracy, "They are here today, and gone tomorrow."

The waxy-white, ephemeral petals qualify the bloodroot flower to be a symbol of purity and delicacy. The yellow stamens around the central pistil tend to give the flower a yellow center. The stigma of the pistil (the female part of the flower) becomes receptive to pollen immediately after the flower opens and before the anthers in the same flower shed their pollen. Bees and other early-spring insects carry pollen from an older flower to such young, newly-opened flowers. In this way nature insures cross pollination. After a flower is pollinated, its anthers shed their pollen to be carried to other flowers by insects, and the petals drop from the flower like large flakes of snow. As the ovules are developing into seeds, the leaf blade once more assumes its function as a cloak and rolls itself around the ripening seed pod. Later when the seeds are ripe, the pod cracks open and the seeds are dropped to the ground where they germinate and grow into new plants.

When the large leaf is not otherwise occupied, it expands its blade to the sunlight and builds up foods which are sent down into the underground stem and stored. It is this stored food that enables the bloodroot to send forth its leaf and flower so early in the spring. This habit enables the plant to fill its underground storehouse before the leaves of the larger, neighboring plants screen the light away from the lowly plant.

Characteristics which the bloodroot shares with most of the other poppies are the fall of the sepals when the flower opens, early drop of the petals, hairy leaf and flower stalk, and colored sap. Bruise the plant and there will be a liberal flow of blood-like sap. This sap can be seen in the veins of the leaf blade when it is held up towards a source of light. Because the sap of bloodroot was used by the Indians as a war paint, this plant is sometimes called Indian Paint.

Bloodroot flowers are worthless as cut flowers as the petals drop off too easily. However, the plants can be transplanted to the wild flower garden where you will be sure to see them when they announce that spring has come at last.

Friends of ORGANIC GARDENING Can Help Build Its Circulation By Handing Out Our Free Subscription Booklets

Organic Gardening is constantly striving to increase its subscription list. It is important that we tell as many people as possible about the "goodness" inherent in organic gardening.

Perhaps you would like to take an active part in this important program by handing out our subscription booklets to friends, neighbors and acquaintances in your community. Even if you have never sold anything in your life ... *if you are "sold" on organic gardening* ... you will find it easy to turn an idle hour into interesting, stimulating and profitable dividends. If you would like some extra money, this spare-time activity will return liberal commissions. You don't have to give a sales talk or make a follow-up, for the booklet in itself will induce your prospect to subscribe. Through a coded coupon we can trace each subscription to your efforts.

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Write to Organic Gardening, Dept. Q., Emmaus, Pa. We will be glad to send you 25 or 50 booklets. State the amount you want.

The Soil and Health Foundation

THE Soil and Health Foundation which has so recently been organized under the leadership of J. I. Rodale, Editor of Organic Gardening is enthusiastically acclaimed by all who believe that we must observe nature's laws if we want to conserve and reclaim the soil of our Land and the health of our people. The purposes of the Foundation have been set forth in previous numbers of this magazine, but they may be briefly summarized as follows. The Foundation proposes to set up laboratories, experimental farms, schools, and other agencies which may be necessary to establish organic farming and gardening on a scientific basis; and to educate the people concerning the soils, foods, and health of man—and their relation to each other. The responses to the invitation to become members of the Foundation are so enthusiastic and inspiring that we want to share some of them with you.

"Certainly I believe America needs awakening to the dangers of chemically devitalized foods and wasteful land practices that can only end with disaster for us as a nation, if steps are not taken to remove the present menace."

"I was delighted to find in the mail this morning your solicitation for membership in the Soil and Health Foundation. That is the very thing I have hoped for so many years and wished someone would be courageous enough to do . . ."

"You are undoubtedly engaged in a very worthwhile project:—that of educating the public to be more careful in the selection of food, how it is grown and processed. The health of the coming generation will depend on that careful selection, and the future of our country depends on our children—so what could be more important than our health?"

"Here is my contribution which I wish I could make one thousand times as much. May the goddess of Good Fortune smile upon your efforts!"

"I believe that carrying out the purposes of the Foundation as organized has unlimited possibilities for good, and I certainly would like to participate. I hope that the enclosed check will help and I wish you all success."

"I feel that you are doing a fine work. The fertility of our soils must be maintained and kept up if we as a nation are to survive."

"I think this is a really wonderful step forward, and so I am enclosing a check to help advance the program."

"The formation of the Soil and Health Foundation as described briefly in the November issue of Organic Gardening I feel is one of the most progressive movements that has been instituted for the benefit of humanity in many, many years. The basic information that will be developed by your Foundation will be beyond any of our expectations and will serve as a monumental contribution to civilization. Please accept my genuine and sincere best wishes for every success in your endeavor. The enclosed check I trust will serve to assist your foundation financially."

"Please find enclosed herewith my check as a contribution to 'Soil and

Health Foundation' and my best wishes for its success."

"The enclosed check represents my initial contribution for membership to help in 'The Soil and Health Foundation.' It is really high time for something like this. Why try to save the building if we let the foundation go to ruin? This move is one of the greatest to save our glorious Land. May God prosper your efforts!"

The voluntary contributions which have already been made range from 40 cents to $1,000.00, each according to his or her means, but all with the utmost sincerity of purpose. It will be the unity of purpose and the participation on the part of the many that will make the Soil and Health Foundation great. Rarely does one have the opportunity to participate in an undertaking that means so much to all humanity. It means permanent and fertile soils, wholesome foods, rural life freed from the financial yoke imposed by chemicals and poisonous sprays and dusts, and a healthy people partially freed at least from the curse of degenerative diseases.

As some of our contributors have pointed out repeatedly, it is high time that we do something positive about our soils and our health. We shall need the help of all who share these views, and we feel sure that all intelligent, progressive people will support this Foundation. Will you help carry out our soil and health program?

Send your contributions and letters to "Soil and Health Foundation," 46 South West Street, Allentown, Pennsylvania.

William H. Eyster, Secretary.

Cows Prefer Humus-Fed Grass

In the *Compost Club Magazine* (New Zealand), Vol. 4, No. 4, of July-August, 1945, Mr. A. J. Redfern, of Matakohe, North Auckland, records an interesting example of the preference of the grazing animal for grass manured with compost as compared with similar produce obtained by the use of chemicals. The cows, he says, show a definite preference for organically-manured pastures. He carried out an experiment in which he manured three paddocks—one with meat-meal, superphosphate, and lime; the second with superphosphate and lime; and the third with nothing but lime and sheet-composting. The cows had free access to all three. They showed a marked preference for the sheet-composted pasture, spending most of their time on it. The meat-meal pasture was second in favour, and the superphosphate pasture a bad third.

Soil and Health (England)

Autumn Crocus Beautifies the Rock Garden

Plants For The Rock Garden

By G. L. Wittrock, Custodian of the Herbarium,
New York Botanical Garden

PASSING through our Rock Garden in September we have often heard visitors exclaim "Crocus in bloom at this time of year?" True, the plants observed do look like Crocus but true Crocus are of the Iris Family while closer observation will reveal that these plants have characters of the Lily Family. These delicately tinted flowers are bulbous plants of the genus *Colchicum* of which 45 species are known, native of Europe, western Asia and northern Africa. The name *Colchicum* is derived from Colchis, an ancient country east of Euxine and now included in Georgia, Transcaucasia, where the plants are said to grow wild in great profusion. In horticulture 8 species are listed with an additional list of 6 varieties and 1 hybrid, the varieties being mainly of *Colchicum autumnale.*

Our selection of "Autumn Crocus" is *Colchicum autumnale* the one most cultivated. The bulbs bloom in northern latitudes from the beginning of September until November giving a delightful succession of flowers in a rock garden after most summer flowers have bloomed. The "Autumn Crocus" is known locally also as "Meadow Saffron", "Fog Crocus", "Meadow Crocus" and "Naked

Ladies", the latter name being local in England because the flowers come up without leaves.

The bulb is about the size and shape of a tulip bulb, though less pointed at the apex and covered with a darker colored skin. From this bulb there develops a naked blossom with a long slender tube about 4 inches high and 4 inches across on top, usually purplish or white and shaped like our common spring Crocus only larger. The number of flowers produced is usually 2 to 8 depending on the size of the bulb. The seed producing organ remains underground until the following spring when 3 to 4 or more dark green leaves, 9 to 10 inches long and 1½ to 2 inches wide appear and unfold above ground. The stem of the seed organ elongates underground and pushes the pod out from between the leaves in April. Exposed to the air, the seeds finally ripen in May.

The plants prefer a light sandy loam which should be enriched with decayed manure, leaf mold or compost. They grow best in rockeries, under shrub borders or in lawns near shade trees where the grass is not too thick. Bulbs should be planted 4 to 5 inches deep and 3 to 6 inches apart in July or August. Seed propagation is also possible but seedling bulbs do not flower until they are 4 to 5 years old. Planted colonies should not be disturbed for many years, at least not until they show deterioration, fewer flowers and poor foliage. The colony should then be lifted and the bulbs separated and replanted, doing this after the leaves die in late June or early July.

The dried or fresh bulbs and the seeds of our species contain an active drug which has been used in the treatment of rheumatism and gout since ancient times. Modern herbals describe the medicine as anti-rheumatic, cathartic and emetic. Over-doses, however, cause violent purging and act as an irritating poison. The active principle called Colchicine is listed in the U. S. Pharmacopoeia as a very poisonous alkaloid of medicinal value. Colchicine has also been of extreme value in modern times in the study of plant breeding and genetic research.

Thus the "Autumn Crocus" not only has beauty but it also has an added interest in its economic value to modern civilization.

Winter Storage of Tuberous Begonias

THE BEGONIAN, October 1946, monthly publication of the *American Begonia Society* (1618 Fickewirth St., El Monte, Cal.), reported about experiments on storing tubers. Charles O. Dean in Massachusetts found the following best: The plants remained in the open until a sharp frost killed them, the stalks were cut at the junction of the bulb, dug with the dirt attached to the root and placed in berry baskets, which permit identifications to be written on and provide aeration. These baskets were stored in a potato barrel. This proved better than washing the tubers.

Trace Elements - Iron, Copper, Zinc, Manganese

By DR. EHRENFRIED PFEIFFER

MUCH has been published recently about the importance of trace elements as plant food. Trace elements are those mineral constituents in soils and living organisms which are present only in the most minute amounts. Carbon, hydrogen, oxygen, calcium, phosphorus, magnesium, and silica are "bulk" substances. The main bulk of plants in volume and weight is comprised of them. The trace elements, on the contrary, exist only in amounts so small that they have been overlooked entirely, or their presence has been considered accidental. Only during the last two decades has it been discovered that these elements may play an important role, mainly as biocatalysts. Their presence stimulates and also sometimes hinders the living process in the growing plants. They direct and influence the assimilation of nourishment (the absorption and reduction of carbon dioxide). Their absence can cause definite diseases. Their presence in large amounts can be poisonous in some cases, in high dilutions they may act favorably. The study of these trace elements is truly in its infancy. Nevertheless, we already know that they can no longer be neglected. Their task is chiefly a functional one, i.e. the normal functioning of the growth process is somehow dependent upon their action in live tissue.

Some of these elements may be present in a soil in great abundance, and yet only the smallest amounts are taken up by the plants. Some are highly diluted in a soil, or even not found at all in the environments of plants for which they play a role. They are, to say the least, puzzling and their study is very thrilling to the plant physiologist. Organic methods, which mean indeed the refinement of plant growing methods, cannot overlook them.

Certain weeds, which we use in our composts, are very rich in trace elements while cultivated plants growing nearby may be relatively poor. Farmers and gardeners frequently overlook this fact when supplying their soils with all the bulk elements. Then they wonder why their soils do not produce despite the generous applications of phosphates, lime, potassium, and nitrogen. Maybe there was a trace element missing of which they had never heard before.

Iron: is one of the most essential. It can be present in great quantities, even to the extent that its oxides are harmful to crops. However, traces of iron are absolutely necessary otherwise the wondrous green assimilating substance in leaves, the chlorophyll, will not form. Chlorophyll is an organic substance which transforms light energy into chemical energy, and brings about the transformation of carbon dioxide into other organic compounds inside the plant cells, a process which is called assimilation. This pro-

cess breaks down the carbon dioxide to formic and other organic acids (reduction), and builds up other organic substances, such as sugars, starch, etc. (oxidation). Chlorophyll contains magnesium but no iron. Yet iron has to be present as bio-catalyst otherwise the chlorophyll could not fulfill its task. Quantities of iron as diluted as 1:100,000 do the job. In such amounts, iron is found in almost all soils, with the exception perhaps of peat and muck soils, in dust, and in water. Iron is found in plant cells with a neutral or alkaline reaction in less soluble compounds. In very acid cell fluids it exists in more soluble forms and is easily washed out. Then plants can even become iron-deficient.

Copper: Copper can be very harmful to soil life if it is present in large amounts. Microorganisms and algae are especially sensitive to it. Dilutions of 1:100,000 still can prohibit their growth. On the other hand, it is present in many soils and is absorbed by oats and potatoes in particular. Flax, tomatoes and sunflowers also like it. It seems to influence the formation of seed. Barley and flax do not produce seed when copper is completely absent. Chlorosis (bleached instead of green leaves) and the dying back of fruit tree branches, occur sometimes when copper is absent. It seems that the action of iron is reinforced by the smallest amounts of copper. Enzymes in potatoes and mushrooms contain copper. (Collect wild mushrooms for your compost!) Certain lower sea animals, crustaceae for example, form their "blood" with copper instead of iron. And in higher animals, copper also stimulates the formation of haemoglobin as well as of gall, a liver secretion. On reclaimed heath land (very acid and rich in iron oxides), in Holland, a peculiar disease was observed. The tips of cereal leaves turned yellow or white, seed failed to form. This "reclamation" disease could be avoided by adding minimal amounts of copper sulphate.

Another disease of special interest in this connection is the licking disease of cattle. Cattle suffering from mineral deficiencies, chiefly of calcium, start licking and gnawing at everything, stanchions, mangers, wooden posts.[1] Once they have developed this habit they are difficult to cure, even though plenty of calcium salts are administered. The most minute amounts of copper salts again "heal" this condition. Normally, hay contains 6-12 ppm. of copper. The change to better hay or pasture also brings about a cure of the licking disease. Babies even develop similar symptoms, eating stones, dirt, manure, bits of plaster from the wall, indicating mineral deficiencies. Whether copper would help here is not known as yet. By no means should one overdo the application of copper, but use it only periodically, for a period of six weeks, for instance, in scouring cattle.

Zinc: There has been a great deal written recently about the importance of zinc. The symptoms of zinc deficiency are also very characteristic and seem to appear in certain plants more than in others. There is the phenomenon of rosetting. In spring, trees develop a rosette of small stiff leaves, instead of the normal long shoots. This disease is also known as little leaf, mottle leaf or yellows, and is well known to citrus, apricot, and peach growers. Tomatoes, corn, mustard, squash, and buckwheat, can also be affected by zinc deficiency. Abnormal leaves will grow with a retarded differentiation; dwarfing, paleness, downward curvature, and other symptoms are observed. Traces of zinc seem to be necessary for garden peas, wax beans, and sorghum, in order to produce seed. The minimum concentration for peas is 0.005 parts per million, for beans and sorghum 0.1 parts per million. The yellow mottling of the leaves on branch tips, and rosetting in pecan trees, resulting in small, misshapen, abnormal leaves, can become a nasty disease which has forced

1 The writer observed in Switzerland and Holland that the licking illness occurred chiefly on farms which were onesidedly treated with mineral fertilizer, particularly where an excess of potassium was present.

growers in the Southwestern states to abandon hundreds of acres of pecan orchards, while in some Southwestern orchards over 95% of the trees showed the disease. The walnut, belonging to the same plant family as the pecan, manifests similar symptoms, although not such severe ones. In California, the little leaf disease on deciduous trees is known. Fruit does not set, or does not last, on affected branches. Zinc deficiency shows up in corn on leaves which darken suddenly, and develop a metallic sheen. At night, the leaves begin to "sweat" with deposits of salt. Light yellow streaks may also appear between the veins of older leaves. White bud develops in Florida on land which has been cultivated for many years. Zinc sulphate has been used (20 lbs./acre) in order to counteract this disease with the result that the yield was better than with any inorganic fertilizer without the addition of the zinc. However, and this may interest the organic gardener, the use of manure and leaf mould produced a similar result. Spectroscopic analysis showed the presence of zinc in organic manures.

Zinc is also found in wild mushrooms, particularly in poisonous ones. These, which otherwise have no practical value, have an extremely high zinc content, namely, anywhere from 41 to 279 parts per million of the dried mushroom. Rudolf Steiner, the founder of the biodynamic method, recommended having little "gardens" of mushrooms in the compost yard for their "beneficial effect." For many years we did not understand why, but now it becomes clear that the addition of mushrooms to a compost heap can be very helpful. In fact, years ago in Switzerland, this writer used always to add wild mushrooms to experimental compost heaps. Such compost can be particularly helpful against the leaf wilt of tomatoes as well as the above described rosetting illness. Cotton also contains much zinc. Among plants growing on or in ponds duckweed (Lemna minor) contains zinc. This plant is particularly interesting because its natural radioactivity is about ten times stronger than that of its surroundings. It is also, by the way, an excellent pig feed as well as a valuable composting material.

What is the function of zinc in the growing plant? Zinc is found in the mucous membranes of animal stomachs in an enzyme called carbonic anhydrase, especially in cattle and sheep (hence also in their manure). This enzyme is a zinc-protein compound. When this enzyme is present in the red blood cells it seems to speed up the release of carbon dioxide from the blood. While in the stomach, it is believed to be connected with the formation of hydrochloric (stomach) acid. Recently, it has also been discovered that it influences the formation of the male sex hormone. In plants zinc appears in connection with growth hormones, known as auxins, bringing about an increased oxidation process in the living tissue. It is a growth promoting factor; its experimental addition results in an increased auxin content. Therefore, this trace element may work against the aging of organisms. For zinc deficiencies are more apparent in old plants and trees and scarcely noticeable in young annual plants. Zinc can become inert and is found in a precipitated state in fine, powdery, limestone soils, muckland and in marl. Superphosphate will cause its precipitation.

Manganese: Eastern soils, in this writer's experience, are frequently very deficient in manganese. The contrary is true for European soils which usually contain at least traces of it. Therefore we note the results of these deficiencies more often in America. The first symptoms are speckled leaves or chlorotic streaks on grains and grasses. These are followed by withering and stunted growth. One example is the so-called grey speck in oats. Wheat, barley, and rye are similarly affected Sugar beets, mangolds, red beets, and spinach develop speckled yellows, with retarded growth and curly leaves. All these diseases can be cured by the addition of highly diluted solutions of

manganese salts (sulphates). Peas develop marsh spots, brown or black spots on the seeds in the pods. Healthy and affected pods may appear on the same plant. This symptom is most often observed on alkaline soils and on young, reclaimed polder land in Holland.

Manganese stimulates the assimilation and is typical bio-catalyst. Less sugars are found in plants with manganese deficiencies. Muck land and swampy soils are poor in this element, while certain dark red to purple soils, rich in manganese, produce the very best, fiery wines, Tokay wine, for instance. The more acid a soil is, the more damaging an excess of manganese can be. Such an excess is hostile to clover, but hyacinths like it. Tobacco almost "swallows" manganese, but can be damaged in the process when growing on an acid soil. It seems to assist in the formation of fibers. Manganese stimulates the duckweed (mentioned above as a "radioactive" plant). Manganese and iron seem in some way to cooperate in their effect on the assimilation (oxidation-reduction process) and on the formation of chlorophyll. The oxygen intake of wheat roots in experiments was increased from 155 to 470% with the addition of only 0.00005 milligram of manganese chloride. It seems to bring about the re-oxidation of iron in plant cells where this has been previously reduced. In other words, manganese and iron are in a check and balance relationship similar to that of Congress, President and Supreme Court. The proper ratio between these elements is the decisive factor not the absolute content. How can we bring about this proper ratio, which should be about 2 parts of iron to 5 of manganese? The answer to this question leads right into the practical problems of humus and organic methods. There is no doubt that a humus soil absorbs and stores excesses of trace elements. Therefore, plants in need of one or another of these elements can draw upon this storehouse and trust their own inborn chemical wisdom with better results than we could ever bring about by artificial means. Seaweed is rich in many trace elements, including manganese and iodine. Compost from seaweed therefore can heal manganese deficiencies in sugar beets and spinach, as this writer has had the opportunity to observe in England and Holland. Compost made from the water hyacinth in Florida ought to do some good in this connection. Some fruit trees contain and require manganese. Wood ashes in compost may be helpful in this regard. This entire field of study needs a great deal more investigation.

A suggestion to the reader: It is unavoidable that technical terms have to be used which are not familiar to the reader, in this series of articles on microlife and trace elements. Therefore, if you encounter any difficulties, write a postcard to the author mentioning the terms which bother you.

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Asparagus In The Garden

By M. B. CUMMINGS

Professor Emeritus, University of Vermont

ASPARAGUS is easy to grow and simple to care for, yet few home gardeners attempt it. It can be started late in fall or early in spring by using one or two year old roots as transplants. Asparagus is an important home garden vegetable, perennial and permanent. Aside from being easy to grow, it is also easy to harvest, and simple to cook. And last but not least, it is delicious to eat. With good care a bed will yield well for a dozen years or more; and be in production every year after it is established. Beds have been known to yield well for twenty years. The plant is hardy throughout the United States but is not grown much in Florida or Texas. Much is grown in California and New England as a commerical crop.

Starting the bed

The first consideration are varieties. There are five sorts in general use. Till recent years Redding Giant, Argenteuiel,—a French variety, and Palmetto, were set. These are, however, only partially rust resistant and have been generally replaced by more fully rust resistant forms such as Martha and Mary Washington which in most places are fully resistant to the rust disease and are of superior quality and high yielding. Paradise variety, new in '41, of fine quality, comes into production sooner than most varieties. It is tender, mild and rust resistant. Recent experiments have shown that an improved strain of the Washington asparagus can be obtained by selecting parents for crossing that possess better than normal attributes, and the offspring have superior yielding propensities. "Gilt-edged," so to speak, male and female plants are used to make the cross. If one cannot secure roots for setting from a neighbor or in town, he may purchase them from most seed houses.

Raised from seed

Seedlings or one year roots, as one may choose, can be grown from seed. The red berries seen on the plants in fall are the seed pods which contain dark brown or black seeds. These may be picked any time in the fall after they have turned red and spread out thinly in a well ventilated place to dry thoroughly. These seeds can be planted early in the spring in shallow furrows about one half inch deep and two inches apart. An ounce of seed at 10 or 15 cents an ounce according to variety will give 250 plants, or 30 feet of row. Less than an ounce can be bought in small packets. The seedlings are allowed to grow one or two seasons and are then transplanted to permanent places. Large yields should not be expected sooner than four years from seed, or three years from sets.

Planting out

One or two year old roots, as one may choose or as one can get them, are set out in early spring or fall 15 - 24

inches apart in rows three feet apart. If no power cultivator is to be used, the rows soon become a bed. In commercial culture a tractor maintains the rows as volunteer plants are eliminated between the rows. In garden culture, prepare the bed as follows: Dig a trench 18 inches deep, 12 inches wide, and fill in with well rotted manure or compost. Then set the roots 12 - 18 inches apart from crown to crown, spreading the roots in all directions. Cover with soil, packing it well among the roots, and fill to the top as the roots develop. One may top dress with compost and add salt if the ground is permeated with witch grass.

Cultural requirements

Asparagus needs clean culture. Green sward is to be avoided, especially if permeated with witch grass or weed seeds, as these two types of plants increase the labor of clean cultivation. Economy, therefore, prompts the careful selection of the site for asparagus. A deep, rich loam, slightly sandy, rather than a clay loam, is preferred. It is better not to depend on salt though the asparagus tolerates it, as it is by nature a saline species and is not harmed by a salty soil.

Rich soil helpful

Asparagus needs much plant food and plenty of moisture. It should grow rapidly to be of good quality. High production comes only from good soil. One should use quantities of compost both before planting and as annual top dressings. These products supply the needed bacteria for organic activity; they supply good plant food and maintain the humus content of the soil. They also increase the water holding capacity of the land, which is important. Land for asparagus is never too rich and there is no danger of overdoing it. Sixteen to twenty tons of compost an acre could be called the minimum rather than the maximum amount at the start; and one-third as much in annual top

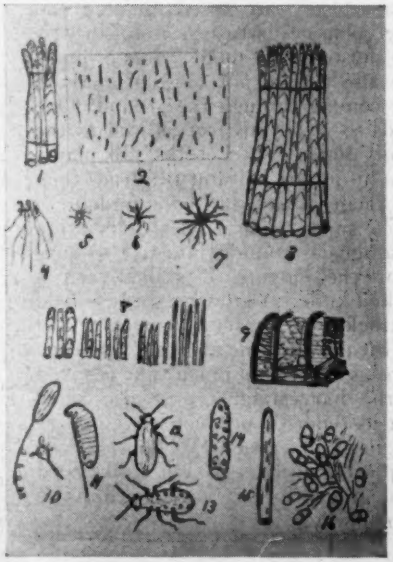


Diagram on asparagus: 1, small bunch all edible stalks; 2, bed with tall and short stalks; 3, large sales bunch, but 1/3 up from butts too large and hard to eat,—much waste; 4, two-year roots with buds; 5, 6, 7, one and two year roots for setting out; 8, left to right, short all good stalks, poor ones at right; 9, bunches for grading, tieing, and cutting butts off even; 10, eggs and worm of asparagus beetle; 11, grub of the asparagus beetle; 12, common beetle; 13, the twelve spotted beetle; 14, shoot injured by beetle by eating out round holes; 15, rusted shoot with slits of rust, red in summer, black in fall; 16, two-celled rust spores, greatly enlarged and black, that winter on stems or on ground to reinfest the plants in the spring.

None done to definite scale.

dressings will give good returns. It should be noted that good growth in one season makes for good production the next year.

Cutting the shoots

Good quality asparagus comes from the large stubby shoots,—the slender ones being of little or no value. In recent years there has been a trend toward shorter stalks with but little green in them. This, however, is a mistake. Green shoots if tender are more nutritious than white ones, as they are richer in vitamins and other ingredients. It is well, therefore, one might say urgent, to cut or to buy and use the green rather than the white asparagus. On a new bed no cutting should be done during the first growing season; and for only three or four weeks in the second year; but in the third season one may cut for ten weeks or more. In the cutting season one should go over the bed every two days to get all sizeable stalks before they get tall and tough, as there is much waste at the butts when the tissue gets hard, fibrous and stringy. Sometimes shoots are half waste because they are too large and too long. One needs to be careful in cutting not to injure small shoots or buds, and also careful not to step on those just coming through the ground. One needs to watch his feet as well as the shoots to be cut. Let the tall plants stay up in the fall and till dead, then cut them closely down for mulch.

The snapping method of harvesting asparagus is coming into use to supplant the cutting of stalks with a hooked knife. A growing spear is held just below the tip and bent over, and the break will come at about the same point as if cut, and much time is saved in the harvesting. Tests also show that as tender a product is secured as one need to expect. When sold, the snapped as well as the cut stalks need to be graded for size and length in the regular way.

Food values

Despite the fact that asparagus is not a rich hearty food like peas and beans, it is rich in vitamins if the stalks are green. Asparagus ranks well in thiamin, the B_1, and in riboflavin, the B_2, and has 700 I. U. of A_1, the carotin, so it has, aside from its energy producing property, much value. It also has traces of iron, calcium and phosphorus; and of course high moisture content which does no harm. Asparagus on toast is a dining car delicacy! And who does not like it at home in any form,—when he can get it? The tender tips may be sliced raw and used in a salad or cooked and seasoned with butter. Boy! There is no warrant for white stalks; choose the green ones. They are better; lily white ones mean little food value. The seasonal demand for asparagus reminds one of the frequent statement at the store, "all sold out"!

Asparagus pests

Two types of trouble sometimes cut deep into the yield and profits. These two are the asparagus beetle; and asparagus rust,—unless the rust resistant varieties are used.

Asparagus beetle. Wherever asparagus is grown the voracious beetles are likely to attack it. These creatures begin their depredations as soon as the shoots push up above the soil in the spring and continue to damage them for many weeks. The beetles gnaw out the tender buds at the tips and cause the stems to be seared and browned, and often bent to one side. Beetles and worms feed on the stems; the former in late summer.

The life history of the beetle can be briefly stated. The adults are small black shiny creatures one-fourth inch in length. They are blue-black in color, with dark blue wing colors, and lemon-yellow borders. The beetles winter in sheltered places, under loose bark and in split fence posts and on trash. The eggs are laid by the hundred in rows on the stem in April or May. In about a week they hatch into small grubs which migrate to the tips of the leaves and feed upon them. There is a generation each six or seven

weeks. New buds are especially subject to attack. On small areas hand picking of the beetles is effective. This tends to break the life cycle and prevent recurring generations in succeeding years. It is important to keep down volunteer plants early in the season by cutting the stalks every day or two; so as to remove the eggs before worms appear. Burn the clippings to destroy the eggs.

Asparagus rust. Red or brown rust patches on the stems of well grown asparagus represent the symtoms of asparagus rust which is due to a fungus known to the plant doctor as Puccinia asparagi. Affected plants present a yellowish or brownish appearance when viewed from a distance, and the ground under affected plants may be covered in late summer with rusty brown spores. The fungus which causes the rust may over-winter on the dead parts of affected plants. In the spring the spores germinate on new growth and affect any asparagus in the region. The early infections are scattered, but in mid-summer the red rust stage develops, which later turns to brown rusty spots. In a wet summer the disease spreads rapidly to the plants.

In control, pick out and remove all rusted stems as seen during the summer, seek out rusted stalks in the fall and burn them to destroy the fungus that causes the rust. But the cutting must be done while the stalks are green and before the rust is released to the ground, to be effective in reducing rust another year.

Botany of asparagus

The structural features and the functional activities of asparagus should be interesting to a gardener. The plant is a member of the lily family, and is related to tulip, gladiolus and onion. The leaves are small parallel veined, and the stalks have much pith with fibers and water tubes running through them. The flowers are dioecious, having male and female ones on separate plants; but occasionally a perfect flower is seen on the same plant. All flowers are on the plan of three; each whorl is a set of three; the seeds occur in a berry of three carpels with usually two seeds per carpel. A pound of dry seeds may contain 20,000 or more seeds. The crown of the asparagus plant is a mass of branching rather woody rhizomes with buds at the tip which grow into edible shoots. Rather deep planting is therefore desirable for the root system tends to build up a little higher each year. The root system has many tubular roots, which bear many fibrous feeding roots as branches.

The leaves of asparagus are unimportant. They are mere bracts ranging in size from one-fourth to three-fourths inch in length; and they become woody. What seems to the unobserving, as leaves are really branches, as shown by their origin in the axils of the bracts or leaves. The parent species of the asparagus still occurs in the wild, as an escape from gardens and reverted to a wild form. It can be found in uncultivated places in California and in New Jersey. The species probably came originally from southern Europe.

If one thinks the original labor or expense in starting a bed is high, he should be reminded that he plants but once in 10 - 20 years, so the average expense for the whole period is not large. A well cared for asparagus bed may last a fifth of a century!

Ornamental asparagus, the tender, climbing perennials, the florist's greens used in bouquets, are feathery foliaged plants—Asparagus plumosus-nana means a dwarf with flat lacy fronds, and A. sprengera in long feathery sprays are much used. These are next of kin to the edible garden species, and are similar except for the tops. The roots and rhizomes are alike in all species. The garden species with large edible stalks is Asparagus officinalis.

PROOF!

(A)

Guesses won't do at the "Organic Gardening" Experimental Farm. Dr. William H. Eyster, Managing Editor, wants only proof!

(B)

A marigold, with hereditary units doubled, shows unusual growth and profusion of bloom, when grown in composted soil. Dr. Eyster then takes a micro-organism count of the soil that produced these flowers.

(C

Tomatoes, too, r
to Nature's sche
Note the differ
plant. Row 1,
2, earthworm ca
artificially ferti
no fertilizer

(D)

The thermometer gives the proof. This compost heap is showing an excellent decomposition rate with the use of cultured bacteria.

(C)

Tomatoes, too, respond quickly to Nature's scheme of things. Note the difference in these plants: Row 1, compost; Row 2, earthworm castings; Row 3, artificially fertilized; Row 4, no fertilizer of any kind.

Botany for the Gardener (3)

By DR. WILLIAM H. EYSTER

The Green Algae

The green algae inhabit fresh waters and the surface waters of the sea. Some of them are microscopically small, while others are large enough to be seen with the unaided eye. With few exceptions the green algae contain only the regular chloroplastid pigments. One of the simplest and most primitive chlorophyll-bearing organisms is *euglena* already referred to and illustrated in Fig. 2. Ordinarily euglena possesses bright green plastids, but in the dark in the presence of organic substances it loses its chlorophyll and lives saprophytically after the manner of many one-celled animals. This plant-animal type of organism is somewhat spindle-shaped and possesses a single flagellum attached to the anterior end of the body. By means of this flagellum it is able to move through the water, although it may move also by changing the shape of its more or less plastic one-celled body.

Another group of microscopically small, one-celled, flagellated plants are the *peridinales* illustrated in Fig. 3. These somewhat disc-shaped cells have a cellulose wall which usually is impregnated with inorganic salts.

Algae On Bottom of Ponds and Ditches.

If you were to study the ooze from the bottom of a ditch or a pond under a microscope you would find among other plants great numbers of brownish, motile, boat-shaped or box-like, brownish green plants known as *diatoms*. Some common diatoms are illustrated in Fig. 4. Although these plants are one-celled, they tend to remain together in loose colonies having the form of a belt, a fan, and the like. Each cell has two shells made of silica which fit together like the lid and base of a pill box, as illustrated in Fig. 5. Under the microscope the single celled diatoms have the appearance of small boats or gondolas moving gracefully through the water. In the course of many billions of years the shells of diatoms have accumulated to form great deposits of *diatomaceous earth* which is now used for polishing silver, filtering gasoline, and as a filler in dynamite.

A Progenitor of Plants and Animals

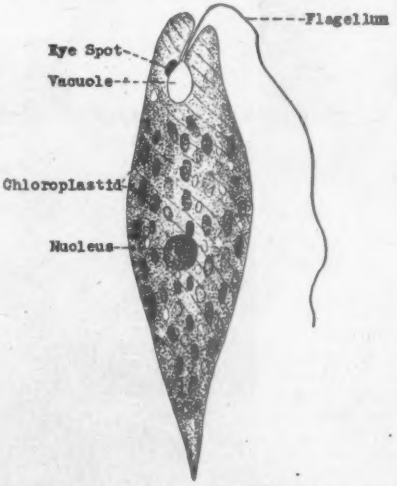


Fig. 2 Euglena is a Plant-Animal Organism

FLAGELLATED ALGAE WITH CELLULOSE SHELLS

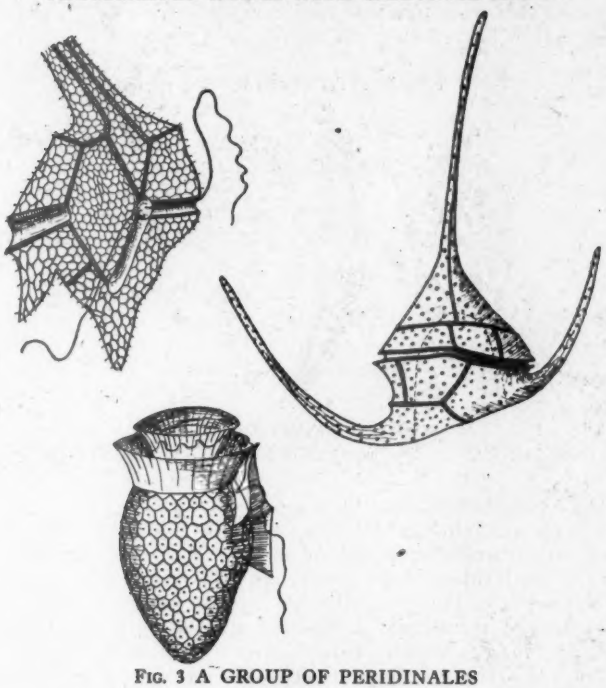


FIG. 3 A GROUP OF PERIDINALES

ALGAE OF STAGNANT WATERS

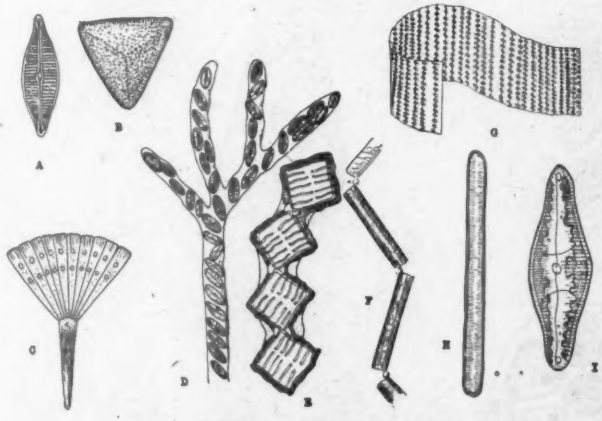


FIG. 4 *SOME COMMON DIATOMS*

THE BOX-LIKE SHELL OF DIATOMS IS MADE OF SILICA

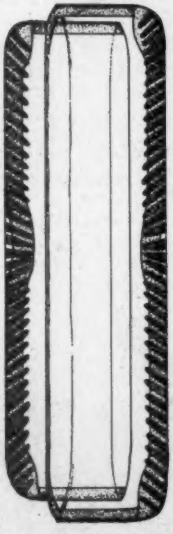


FIG. 5 A COMMON DIATOM

Associated with diatoms are apt to be bright-green, bilaterally symmetrical, one-celled algae of various fantastic shapes as illustrated in Fig. 6. These algae, called *desmids*, do not have their walls impregnated with silica as in the case of the diatoms.

FRESH WATER ALGAE

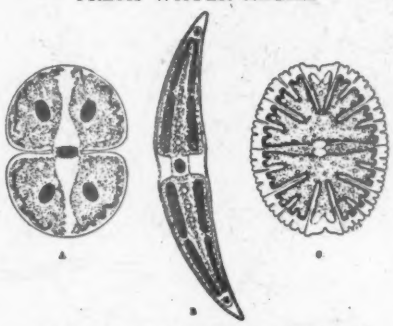


FIG. 6 SOME COMMON DESMIDS
A. COSMARIUM B. CLOSTERIUM C. MICRASTERIAS

Some Non-filamentous Green Algae.

Some of the most common green algae which do not have their cells joined end to end to form a filament or thread are shown in Fig. 7. *Pleurococcus* occurs commonly on the north side of trees, fences, and other structures and gives them a green, granular surface. This one-celled algae is far too small to be seen as an individual without the microscope. Under the microscope it still looks exceedingly small and has the general structure shown in the drawing already referred to in Fig. 7. Note in particular the outer cell wall, the horseshoe-shaped chloro-

NON-FILAMENTOUS GREEN ALGAE OF POND AND STREAM

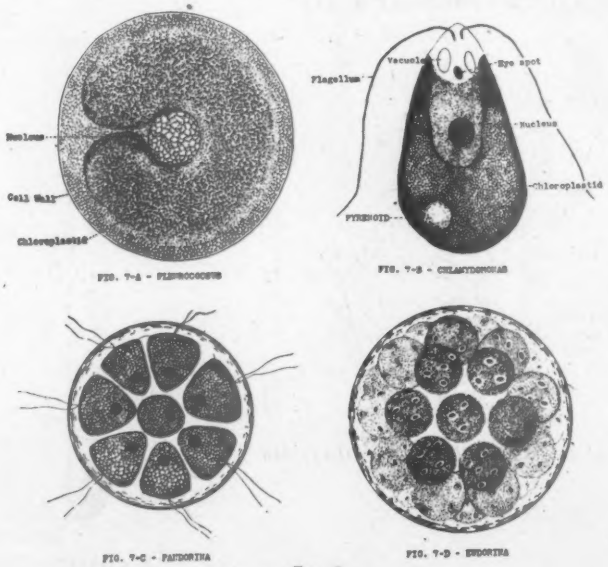


FIG. 7-A - PLEUROCOCCUS
FIG. 7-B - CHLAMYDOMONAS
FIG. 7-C - PANDORINA
FIG. 7-D - EUDORINA

FIG. 7

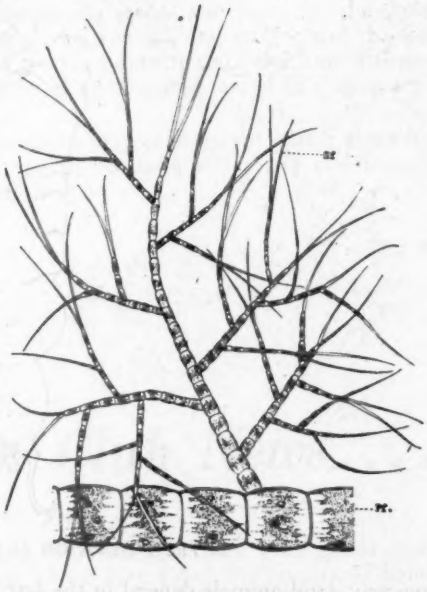
plastid, and the smaller spherical nucleus. It is only when there are countless millions of these small plants growing together that they can be seen as a green encrustration on moist surfaces.

Chlamydomonas, a small alga with a large name, occurs in water and has two long cilia as organs of locomotion. This one-celled alga has a cup-shaped chloroplastid, a pair of vacuoles which drain waste products out of the cell, a spherical nucleus, a red eye-spot which is sensitive to light, and a pyrenoid in which the plant's reserve food supply is stored.

Pandorina is a 16-celled alga in which the cells are grouped together in a spherical mass. *Eudorina* is a somewhat larger alga and has its cells grouped in the form of a hollow sphere. All the algae illustrated in Fig. 7 are microscopically small and can be seen with the naked eye only when they are massed together in large numbers.

ALGAE OF THE POND AND STREAM

PART OF A FILAMENT OF SPIROGYRA



PART OF BRANCHED FILAMENT OF DRAPARNALDIA

FIG. 8

Filamentous Green Algae.

The larger green algae are filamentous or sometimes leaf-like in structure. A filamentous alga consists of a series of elongated, cylinder-shaped cells joined end to end as illustrated in Fig. 8. *Spirogyra,* so named because of its spiral-shaped chloroplastids occurs in practically all bodies of stagnant water, and is commonly called *pond scum.* It can be recognized on sunny days by its bright green color and the bubbles of oxygen, often called frog's spittle, among the filaments. These bubbles of oxygen make the filaments buoyant so that they float during the day time when they are carrying on photosynthesis and sink to the bottom at night as soon as the oxygen escapes into the air.

Another common filamentous green algae is draparnaldia also shown in Fig. 8. Draparnaldia has a branched filament in which the terminal cells of the

branches are elongated into spine-like projections. It grows in the rapids of streams and is attached to the stones in the bed of the stream. There are many kinds of such algae in our fresh waters, but they are being killed by the poisonous wastes of our civilization.

Plankton.

The green algae also make up practically all the plant life in the surface waters of the sea. With few exceptions these algae are microscopically small but are present in such vast numbers that the water looks green. Their small size makes them buoyant so that they remain floating near the surface where there is sufficient light for their needs in photosynthesis. These floating plants are commonly referred to as *plankton.* These floating algae serve as the first link in the food chain of all marine animals. That is to say, all marine animals depend directly or indirectly, on the plants in the sea for all their foods. In the

ALGAE OF THE SEA

FIG. 9 ULVA OR SEA LETTUCE

same way, land animals depend in the last analysis upon the green plants that grow in the soil for their food supply. Some animals take their foods directly from plants, while others eat animals that use plants for foods. These food relationships are called food chains. An example of a food chain is green plant (nasturtium)—aphis—ladybug—bird—cat. There are similar food chains in the sea extending from the plankton to the largest species of fish.

Algae and Soil Fertility.

According to Sir Albert Howard one source of nitrogen in all probability is fixation from the atmosphere in the algal film on the surface of the soil in rice fields.

The algae which live in our rivers and smaller streams absorb the plant nutrients which have been eroded from our agricultural lands and are being carried away to the sea and build them up into organic compounds. These algae constitute the first link in the food chain of all our game fishes, as trout, bass, salmon, and others. To the extent that these game fishes are caught and

returned to the land, the nutrient elements in our streams are being restored to our soils.

The emptying of industrial wastes into our streams as well as the surface drainage of waters from lands which have been heavily treated with chemical fertilizers and from orchards which have been sprayed with poisonous sprays and dusts are not only killing the fish but also the algae which serve as foods for the fish. From his cottage along the shore of the Susquehanna River the author has seen thousands of dead fish floating down the stream.

One of the most common fungicides used in the spraying of orchards and various farm crops such as potatoes is copper sulphate or blue rock. We can be absolutely sure that considerable amounts of this copper salt are dissolved in rain water and carried to our creeks and rivers. When we realize that one part of copper sulphate in a million parts of water will kill algae and other aquatic plants, we get some appreciation of the effects of poisonous sprays on our game fishes. A decade or two ago our streams were rich in algae and well stocked with fish, while today they are mostly sterile and serve for the most part as drains to carry away industrial wastes, sewage, and products of the soil —plant nutrients and the poisons that we are pumping onto the land with increasing fury. When will we see the folly of all this, and return to a more sensible civilization?

(Readers who are sufficiently interested may send to the editor algae for identification. Place them in a glass vial or bottle in water and add enough formalin to kill the algae and preserve them.)

Organic Garden Club News....

The Greater Muskegon Organic Garden Club of Muskegon, Michigan is blazing a brilliant trail in organic gardening activity. According to Mrs. Lillian H. Eyestone, Secretary-treasurer of this club there were 30 charter members, but this number has been greatly increased since its organization. Mrs. Eyestone has since reported that other Organic Gardening Clubs were organized at Shelby, Michigan on October 30, 1947 and another one at Newaygo, Michigan on November 6. We salute these clubs and offer our complete cooperation with their activities.

It is requested that all organic gardeners in the general vicinity of Baldwinsville, New York get in touch with Mrs. Edith B. Guyvits, 17 Salina Street, Baldwinsville, N. Y. for the purpose of organizing an Organic Gardening Club.

Mrs. Katharine Remsbey, 1727 Bush Street, Santa Ana, California is interested in organizing an Organic Gardening Club in Orange County and would appreciate having readers or subscribers to the Organic Gardening Magazine, who may be interested, to contact her.

All interested in an Organic Gardening Club call Mrs. Della Montgomery, 1228 Lincoln Way, San Jose, California. Telephone - Columbia 689.

The Story of a Lemon Tre

FOR the past several months I been telling about *other folks'* gardens and orchards. It's about time for me to make another report on my own tiny Biological Research Farm situated in my own back yard. In other words, we'll take a second look; for after all, what I see in my own home garden means more to *me* than all the other gardens around the circle of the earth. So let's come home! (Unfortunately, this "second look" may prove my last, as I have just sold my Gardena property for a new home in Paradise! But that won't in any way hurt or detract from the story of my baby lemon tree.)

In the early spring of 1945 I acquired a mysterious "urge" to decorate my little spot with a variety of citrus trees. World War II was just coming to a dramatic close, and prices of all commodities were still soaring above the Los Angeles fog or "smog" into the

Plate A—ARMSTRONG SEEDLESS LEMON AFTER FIVE WEEKS OF ROCK MULCHING, AUGUST 1, 1945.

This tree was planted March 1, 1945. It showed no signs of life or growth until after leaf-and-rock mulching in July. By August 1, 10½ inches of new growth had developed.

...Tree . . . . By HERBERT CLARENCE WHITE

Plate B—SAME TREE AS SHOWN IN PLATE A AFTER ELEVEN MONTHS OF ROCK MULCHING

This photograph was taken June 1, 1946. Note the luxuriant growth and excellent foliage.

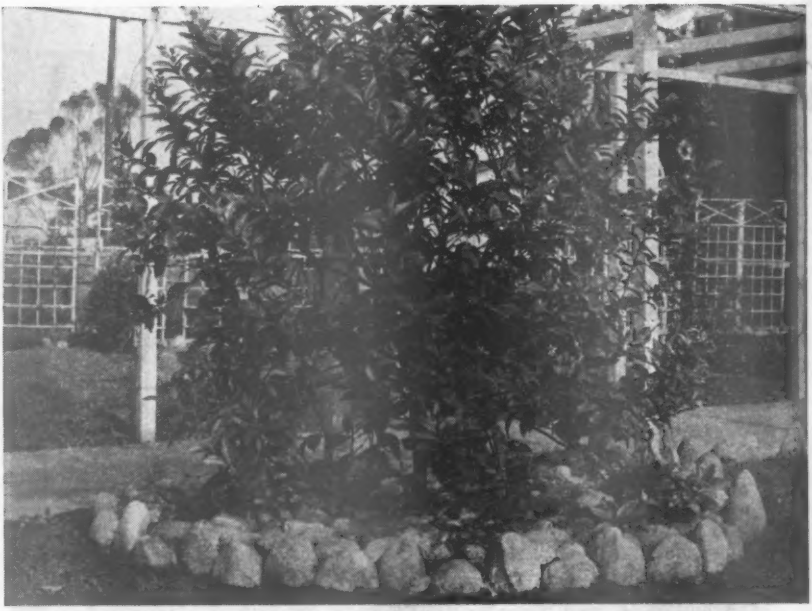


Plate C—THE SAME ARMSTRONG SEEDLESS LEMON TREE AFTER EIGHTEEN MONTHS OF ROCK MULCHING

The tree grew so rapidly that the leaf-and-rock mulching had to be enlarged from three to nine feet in diameter. Note the luxuriant growth and heavy fruit set.

blue skies. Fruit especially, was at a premium, and it was with an eye to help cut down those formidable market bills that gave added impetus to my desire to substitute evergreen fruit trees for such decorative shrubs and vines as oleander, hibiscus, Cedrus deodora, and bougainvillea.

A trip to the Armstrong Nurseries in Culver City revealed the interesting fact that I could purchase both tree-type and bush-type lemons—and lemons are one of our most valuable "protective" foods. The Meyer lemon (originally from China) that will withstand ice and snow, and still survive and produce heavy crops caught my fancy. I purchased a tiny bush-type specimen in a gallon can. The story of this baby tree and how it produced a whale of a crop only a few months after planting has been told in the December, 1946 issue of this magazine.

My choice of a tree-type specimen was a two-year-old Armstrong seedless lemon. It was early March (but of course you know that "balled" citrus trees can be planted the year round in "sunny" Southern California.) I had prepared the holes (big ones) for my newly-acquired treasures well in advance of planting time. Leafmold, well-finished compost, peat moss, and last, but not least, a colony of Dr. George Sheffield Oliver's famous "Soil-ution" earthworms went into the preparation of those holes.

In my garden we strike yellow clay —hard as a cement walk—at fourteen inches. So we dug holes three feet deep and three feet wide to insure plenty of plant food, and room for the tender feeder roots to develop. I note that the late and greatly lamented Roger

Smith warns against these big holes, but for *my Gardena garden* it works magnificently as you shall see.

In the spring of 1945 I had not so much as heard of stone mulches, so these young trees received nothing more than a layer of straw and some weeds as a mulch. With all the care I had exercised in planting and in preparing a rich, deep bed for my trees, something seemed to hold back my two-year-old Armstrong seedless. The baby bush-type Meyer lemon flourished. A few days after planting it began to throw out new growth with delicate green leaves; but the seedless stood dormant. Week after week, month after month it stood there without any signs of life. Then the leaves on one prominent branch started to wither and drop off! Was I to have a defoliated tree after all that work and bother? It certainly looked that way. I even began to question the merit of Sir Albert's organic methods, and friend Rodale's exhortations regarding the benefits of this "new way of life."

Came June, and I read with deep interest Mr. Rodale's editorial on "Rock Mulches." The idea, immediately took root and fired my imagination. As a boy, with my twin brother Henry, I had spent days on end helping Dad cart rocks "off" the garden. Now here was a plan whereby I could spend my declining years carting rocks back "onto" the garden! How times *do* change! In fact I am beginning to suspect that organic gardening will soon take complete possession of me, and revolutionize my personal habits, my hobbies, and even make a new man out of me! It has already taken me away from my job and my printshop,

Plate D—THE SAME TREE AFTER TWENTY-FIVE MONTHS OF LEAF-AND-ROCK MULCHING

With a spread of twelve feet, this miracle of growth astonished big-time citrus growers. Some said, "It's unbelievable."

and now it has robbed me of my city home; it has taken me away from the great metropolitan center of Los Angeles, and called me out into a country called "Paradise." As for me, I'm not dead yet; even though I live in Paradise. And what's more, I am fully convinced that all the good angels do *not* reside in the "city of the angels" from whence I came. There are a few angels left for Paradise.. And that is a comforting thought. No, I'm not crying about the change, and neither is Anna, my wife, in spite of a triple dose of poison oak and a "mass-of-itch!"

But to get back to my newly-found interest in *rocks*. I had scarcely finished reading that editorial when I made a dash for the garden. It was four speeds ahead, and no reverse gears for me. All the rocks that I had carefully and painstakingly gathered through the war years for an eventual "outdoor fireplace," I carted over to the diminutive orchard and spread them under my trees.

What a picnic I had preparing the dike-borders, cutting out tin cans to protect the trunks of the young trees from direct contact with the mulches, hauling leaves and compost for the lower layers, and finally arranging the rocks in artistic patterns over the heavy layer of leaves! If you want to "unbend," and get the very best kind of exercise imaginable, just try "leaf-and-rock" mulching—it's a world beater! Those few heroic souls who have tried it will add their confirmatory testimony to my humble observation. One organic garden enthusiast from McKeesport, Penna. writes: "Ouch, my aching back! Since reading the article in the September, 1946 issue on rock mulching trees, I have been carrying rocks and leaves without end. I swear, if I don't get results, you are apt to find a very irate man in your office someday!"

Now we have discussed the *work angle* long enough. What about the *benefits* to be derived from all this "blood, sweat, and tears?" In my garden the results were little short of breath-taking. Within a few weeks after leaf-and-rock mulching, new growth up to fifteen inches had appeared on some of my citrus trees. Even the dormant, partially defoliated Armstrong lemon "woke up," and five weeks after we had applied the leaves and the rocks, up to ten and one-half inches of new growth was waving in the Gardena breezes. (See Plate A.)

"Get your tree to *growing*—and keep it growing," was Frank Hinckley's timely injunction. This baby tree took that admonition to heart so seriously that after the rock mulches were applied, and the earthworms began to "perform" under the stones, it has been growing, *growing*, GROWING, without even pausing for breath. Eleven months after rock mulching, the little branches had reached out with a four-foot spread; at this time the tree was four feet tall. (See Plate B, taken June 1, 1946.)

Seven months later, January, 1947, this little tree was no longer "little." So rapid was its growth that the leaf-and-rock mulch had to be enlarged from three feet to nine feet in diameter. Inasmuch as many of the tender feeder rootlets extend out to the dripline of the branches, it is necessary that the compost humus, the leaves, and the stones that stimulate earthworm activity in the soil, should completely cover that area. (See Plate C.) Did you ever see a prettier tree? Note the heavy setting of fruit, the luxuriant growth, and the deep gloss of the leaves! Yes, in seven months this "baby" tree had shot up to nearly eight feet in height with a nine-foot spread.

Don't look now! But after seven *more* months (August, 1947) this little wonder had the appearance of an adult citrus tree. (See Plate D.) With a spread of twelve feet, and pushing up above the eight-foot grape arbor by at least a foot, this miracle of growth astonished big-time citrus growers, some of whom came long distances to see my tree perform under the impetus of leaves, rocks, compost humus, and earthworms. Moreover,

these visitors were not disappointed at what they saw. One citrus grower from Arizona, with 160-acres of grapefruit, exclaimed, "It's unbelievable."

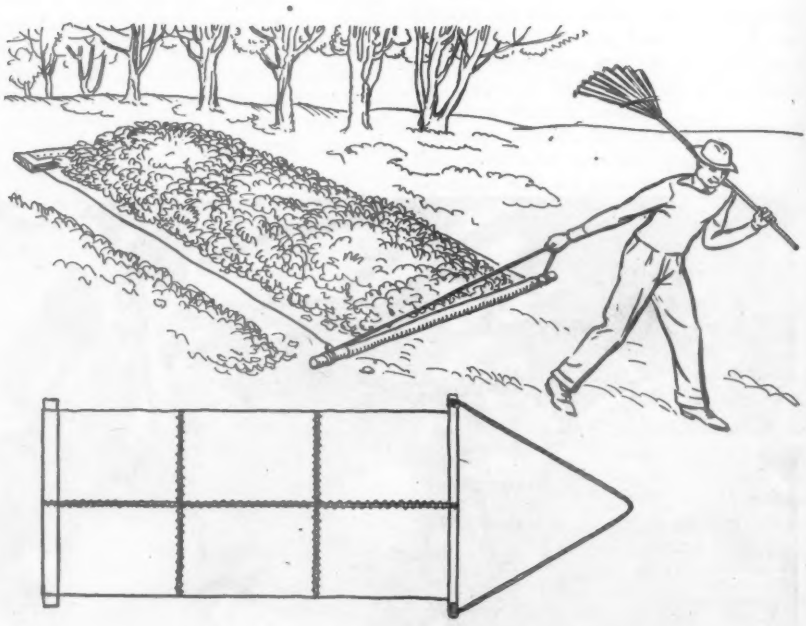
You will note that the nine-foot rock mulch is almost out of sight—hidden by the fruit-laden branches bending to the ground with their health-imparting juices. Yes, we have answered your question, "Was there any fruit?" Plate E gives a close-up glimpse of one small clump of lemons. "What about the size and quality?" The one on the left is three inches in diameter—nearly ten inches around the waist, and is four-and-one-half inches from "stem to stern." "Was there any juice?" One might suspect that these big fellows were thick-skinned, pithy monstrosities. We were pleasantly surprised to find an abundance of juice. In fact, the one in the middle gave us a whole glassful, or the equivalent of from five to seven lemons of ordinary market size. "And what about the flavor?" It left nothing to be desired—except perhaps a little sugar or honey. But in our house, we don't even use a sweetener of any kind in the preparation of lemonade. At least not from organically-grown lemons! In the words of the poet, "Nuf sed!"

Plate E—A CLOSEUP OF ONE SMALL CLUMP OF LEMONS ON THIS LEAF-AND-ROCK MULCHED TREE

A lemon three inches in diameter gives a glassful of juice.

A Reader Suggests

A Simple Device for Moving Leaves to Compost Heap



Open burlap bags to form rectangular pieces of burlap. Fasten them together as shown in the drawing above. The size of the "leaf sled" may be large or small according to the number of bags used.

After the bags have been fastened together, nail them to pieces of wood to form the front and back end of the sled. Attach to the front wooden crosspiece a rope to be used in pulling the sled. Autumnal leaves or other plant material can be raked on the sled and pulled to the compost heap.

Garden Calendar — January

January is the month of seed catalogs, and the time for formulating rather definitely the plans for the gardens of the new year. Even though you are not a draughtsman or a landscape architect, make a general sketch of your flower and vegetable gardens before deciding what seeds and plants you should purchase for spring planting. In selecting your plants, keep in mind the height of the mature plants, time of blooming, color of flowers, and other similar plant characteristics that must be considered in garden planning.

THE NORTH

Flower Garden:—Inspect stored bulbs and tubers in the cellar to make sure that they do not become too dry. They keep best in moist sand. Protect tender bulbs from freezing temperatures.

Sow the seeds of small-seeded annuals as petunia, snapdragon, lobelia, candytuft, and cornflower. It is time also to sow the seeds of begonia, calceolaria, cyclamen, dusty miller, bellis, genneria, gloxinia, Jerusalem cherry, myosotis, and pentstemon. Directions for planting seeds are given on the seed packets and it is well to study them.

Water African violets from the bottom with water that has about the same temperature as that of the room. Do not wet the leaves. The plants like a light window but object to direct sunlight.

Proper care of Christmas plants will keep them in bloom a long time.

Check house plants to determine whether they need repotting. Carefully knock out the ball of earth and if a mass of roots is showing, transfer to a pot 1½ to 2 inches larger.

Stored plants of hydrangea and azalea should be started at this time to bring them into bloom for Easter.

Sunny days may bring to life some of your rock garden plants. See that none of them have their roots exposed unduly and if they have, press them gently into the soft earth.

Trees and Shrubs:—Shake snow from evergreens before it freezes on the branches in such amounts as to break them down. Branches removed with the care of a pruner can be brought indoors for winter blooms of flowering shrubs. Watch for mice around your woody perennials.

Lawn:—Do not abuse the lawn just because the grass is in its winter dormancy. Promiscuous traffic across the lawn should be avoided.

THE WEST COAST

Flower Garden:—Sow the seeds of the tender and half-hardy annuals, and especially the small-seeded annuals like petunia, snapdragon, lobelia, and niermbergia. This also is the time to plant the seeds of such plants as aconite, gentian, helleborus, pentstemon, which germinate better after being exposed to low temperatures. The seeds of hardy annuals can be sown outdoors where they grow to maturity. Seeds of the alpine plants may also be planted outdoors in January.

African violets like warmth, light but not direct sunlight, and warm water applied through the bottom of the pot. Poinsettias need plenty of water so that a good way to water them is to plunge the pot into a pail of tepid water and then permit it to drain 15 minutes before returning the plant to its ornamental container. Cyclamens prefer a cool room that is well lighted.

Winter bouquets may be made of everlastings that were prepared for the purpose last fall, or of flowering shrubs that are brought inside and forced into bloom. For best results it is best to cut the branches under water and with a sharp knife rather than with a scissors-type pruner. Even wild plants as currants, cherries, and plums, can be forced into winter bloom.

Single tulips may be brought into a warm room now. The double varieties do not force well before February. Oxalis plants potted in the fall should be coming into bloom now. Fuchsias may be forced into growth at this time.

Trees and Shrubs:—Newly planted trees should be watered even though the ground seems damp. This will settle the ground snugly around the roots and close up air pockets. It is also a good plan to stake trees as a precaution against being blown over by winter winds. Tie the tree to three stakes placed at equal distances around the tree and at some distance from it. Fruit trees may be pruned during January. This is a good time to prune honeysuckle, trumpet creeper, and jasmine. Early blooming heathers and acacias may be pruned as soon as they are out of bloom.

THE SOUTH

January in the South is a month for both planning and planting. The seeds of practically all plants may be sown outdoors this month in the deep South. Even plants of the more hardy kinds may be set out in January.

Flower Garden:—After setting out alyssum, candytuft, stocks, snapdragon, and violas, plant lily bulbs and gladiolus corms among them and broadcast over the bed some of the easily grown annuals as larkspur, poppies, love-in-the mist, and baby-blue-eyes.

Jerusalem cherry, ardisias, and azaleas may be planted outdoors in the lower South. Azaleas should be pruned back so that they do not bloom this month.

Trees and Shrubs:—January is a good month for rose planting in the South. New bushes should be planted as soon as possible in well-drained, slightly acid soil. Add plenty of compost and you will have healthy plants and large flowers. Established roses should be pruned, except the climbers which should not be pruned until after blooming. Polyanthus and China and old tea roses will not need much pruning. Trees and shrubs can be moved in January while they are dormant. Many of the summer flowering trees will benefit from winter pruning, especially crepe myrtle, and althea.

Alfalfa Mulch

By JAMES B. PARRISH

IN the April, 1947 issue of ORGANIC GARDENING, page 28, appeared an article by Avery Nelson, Garden Editor of the Syracuse Post Standard. In my humble opinion, based on experience, I believe that article was one of the greatest truths ever published in your magazine.

Nelson tried various kinds of mulches none of which were satisfactory until he used ALFALFA—one of nature's wonder plants. A good sized book could be written on the virtues of alfalfa; few people realize its many properties. Most people call it "hay" and let it go at that.

Nelson's experience with alfalfa coincides with many of my own ideas —specific plants for making specific kinds of mulches, and more particularly composts. We have used the alfalfa mulch on this year's strawberry bed with excellent results. Here is the story:

After moving on this place in June, 1945 my wife found six strawberry plants almost buried in a weed patch. The plants were small and apparently healthy. My wife transferred these plants to our garden patch and nursed them along through the remainder of 1945 and again in 1946, allowing them to make new plants by "runners".

This spring, 1947, we set out over 200 plants—all offsprings of the original six starved plants found in the weed patch. This year the strawberry plants were mulched with alfalfa; results were apparent within two weeks and have made remarkable progress to date. Everyone who sees the plants remarks about their husky size and general vigorous healthy condition.

During our mulching program it was impossible for us to mulch all of the plants at the same time. First of all the mulch was applied to about one-third of the patch. After about ten days to two weeks the difference between the mulched and unmulched plants was startling. The plants having the benefit of the rich alfalfa mulch were way ahead of the remainder of the patch. The last third of the patch to get the alfalfa treatment was way behind in production at the end of the early season bearing period.

During late June and July the entire strawberry patch was mulched with alfalfa and we are confident that the late season's crop of berries will be a prolific one. These plants have been identified as Everbearing Mastodons, so they should bear this next month, and up until frost time. This winter the plants will get a protective mulch of alfalfa and leaves. The first mulch was entirely broken down into humus and absorbed or eaten by earthworms, or perhaps a combination of both. The second mulch is on them now, and the third mulch will be applied late this fall.

My wife and I are keenly enthusiastic over the results obtained with the alfalfa mulch; and if you correspond with Mr. Nelson please tell him that we believe he has the right idea regarding mulches. However, it is my

belief that in using alfalfa for mulching he has observed only some of the minor benefits to be attained from alfalfa. Tell Nelson to get ambitious and make a large compost heap of pure alfalfa and test it in certain sections of his garden. Perhaps alfalfa mixed with waste compost from mushroom beds would prove to be a "wonder mixture". It is my hope that some of you gardeners or farmers who have the extra money to do extensive experimental work will enlarge upon this idea of alfalfa or mushroom composts, inoculated with bacillus "brevis" or some other specific organism that will make it possible to raise foods free of blight, rot, and wilt as well as resistance to insect pests.

In my opinion a truly healthy, normal plant will resist all fungus attacks, as well as the attacks of most insects. Healthy normal plants come only from soils containing all the plant foods and tonics which that particular plant needs. What this world needs is a more specific knowledge of the kind and variety of humus and compost, and perhaps bacteria, is needed to normalize a certain soil for all types of plants (tomatoes, potatoes, etc.) which so often are the victims of diseases in today's America.

Going back to alfalfa and strawberries, I must report that our yield of berries for the first half of this growing season, 1947, was gratifyingly satisfactory. Many of the berries from the plants mulched with alfalfa weighed two and three ounces, although most of them were average size.

We enjoy reading ORGANIC GARDENING and profit by the facts gained from its many worthwhile articles. No, I have nothing to sell, no axe to grind—just thought I would pass along these clippings and that eventually they might lead to the publication of some facts useful and new to all organic gardening enthusiasts.

"Organic" Principles Are Gaining Headway

As matters stand today, the "Organic" school of thought is gaining on the believers in artificial fertilizers, who in our country, enjoy the backing of a powerful fertilizer industry and the U. S. Department of Agriculture. Gradually even the unwilling will be enlightened, that excessive concentration upon the chemical aspect tempted agronomists to overlook the biological nature of the soil.

Press Bulletin of the Central Bureau of the Central Verein

On The Organic Front

By DR. WILLIAM H. EYSTER

SOIL DEFICIENCIES CAUSE DEGENERATIVE DISEASES

According to the Detroit Times for August 21, 1947, Dr. Herman N. Bundesen says that Drs. P. H. DeHart and Rufus M. DeHart of Virginia are convinced that many diseases are due to the eating of foods that are grown in soils which are deficient in certain minerals needed by the body. Hospital records show a great increase in thyroid and other gland disorders, vitamin deficiencies, nervous disorders, and sterility.

In animals similar results have been observed. In pigs the birth of hairless offspring is the result of feeding the mother a diet deficient in iodine, while the inability to secrete milk is caused by a deficiency of manganese in the diet. It is high time that we put our soils in order so that we can grow food plants which contain all the minerals, vitamins, and other organic compounds that are necessary to maintain the body in normal health.

—o—

SAVE GRAIN BY CONSERVING VEGETABLE WASTES

Organic Gardening is in full agreement with the plan for conserving such vegetable wastes as pea vines, carrot culls, and unused potatoes into wholesome animal foods as suggested by Michael J. Saada in the November 8, 1947 issue of the Wall Street Journal. The hidden hunger of many a cow and chicken, a horse and turkey could be satisfied if their somewhat scant grain diet could be supplemented with the wastes of such food plants as are grown in soils rich in compost. The American people must become more conservation minded. It is shocking to see along every highway in our beautiful land great heaps of organic materials.

WORMS HELD AS ALIENS

The New York Times for August 3, 1947 reported that an enterprising East Griqualand farmer imported a consignment of earthworms from the United States to aerate and improve his soil—but the South African Department of Agriculture refused to allow the worms to remain in the country on the grounds that they are "exotic animals." Since the worms were still in good shape, the authorities suggested that they be returned to the United States.

The farmer, C. Lupton-Smith of Karg's Post read much about earthworms and the good they can do, but all his efforts to breed local varieties failed. So he decided to import a special variety of earthworm from Ohio. The importation of "exotic animals" into South Africa is forbidden and is permitted only under the strictest circumstances.

—o—

SECRETS IN THE SOIL

According to The Northwest Magazine for October, 1947, wheat growers at the North Dakota Agricultural Experiment Station have found that the production of wheat is largely determined not by the addition of chemicals to the soil but by improving the physical condition of the soil. After 61 years of continuous wheat and without the addition of any chemical fertilizers, a plot yielded at the rate of 37.8 bushels of wheat per acre. The most important lesson taught by this long-term experiment is that soil practices which improve the physical condition of the soil lead to higher yields. It was found that a poor rotation is scarcely any better than no rotation at all.

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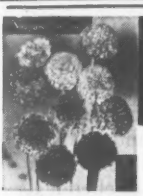

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I. R. Tannehill, DROUGHT. ITS CAUSES AND EFFECTS. (Princeton University Press, Princeton, N. J. 1947. $3.00)

The intelligent reader who has found valuable information in E. Huntingdon's *Mainsprings of Civilization* (John Wiley, N. Y.) will come well prepared to this book by one of the Chiefs in the U. S. Weather Bureau. It is excellently written and ingeniously presented. The idea that soil conservation alone will overcome drought is, of course, not tenable. But what cosmic and terrestrial conditions do produce drought? The sunspot theory and other factors are thoroughly explored. Droughts in the United States are explained as the result of irregular movements of air masses coming in from the Pacific. Every naturalist and weatherwise thinker will enjoy this splendid and inexpensive book, and, what is more, every intelligent person can understand it, because it is excellently written. Highly recommended.

Harry R. O'Brien GARDENER'S SLIDE RULE FOR FLOWERS AND VEGETABLES (The Union Fork and Hoe Co., Columbus 8, Ohio. 10 cents)

For a quick introduction into the essential facts of growing plants this is an excellent and inexpensive piece of literature. You find beside the name the period of bloom, color, habits, planting time, time to divide, or other necessary information, including depth of planting seed, row distance etc. As you shift a cardboard sheet across a slit in the cover you get the information all at one glance. A map of last killing frosts and some tables make the item even more useful. Highly recommended.

Montague Free, GARDENING—A Complete Guide to Garden Making (Harcourt, Brace and Company, 383 Madison Avenue, New York 17, N. Y. 1947. $4.00)

This book is, as the name indicates, a complete guide to gardeners in the solving of all kinds of garden problems. It is one of the most complete garden guides that has come to our notice for a long time. It provides the answers to questions on all aspects of gar-

dening and home-ground plantings. Mr. Free begins his book with the selecting and planning the property and treats simply and effectively all matters pertaining to the grading of the grounds and the establishing of lawns, borders, various types of gardens, and the necessary techniques of the successful gardener.

Walter Stiles, TRACE ELEMENTS IN PLANTS AND ANIMALS (The Macmillan Company, 60 Fifth Avenue, New York. 1946. $3.00)

The rapid depreciation of our soils in recent years with at the same time an ever increasing number of degenerative diseases of plants and animals has aroused a new and urgent interest in the nature of soil fertility. This book presents an excellent review of the researches which established the importance of the trace elements. The author discusses in relatively simple language the trace element deficiency diseases of plants, the function of the trace elements in plants, and the degenerative diseases in animals that result from the use of deficient plants as foods.

P. Alston Waring and Clinton S. Golden, SOIL AND STEEL (Harper and Brothers, 49 East 33rd Street, New York 16, N. Y. 1947. $3.00)

The authors of this book represent a farmer and a steel worker discussing the problems which are common to the workers of the farm and the workers in industry. They have made a careful analysis of the political and economic relations of various kinds of workers in an attempt to find reasons for the long-standing sense of conflict between them. This book opens a door to better understandings of our fellow workers.

Vance Johnson, HEAVEN'S TABLELAND—The Dust Bowl Story (Farrar, Straus and Company, Inc., 53 East 34th Street, New York 16, New York. 1947. $3.00)

This book is a tragic story of man's mistreatment of the soil. As a rule the breaking of the Laws of Nature is followed by terrible and oftimes tragic consequences. Nature fitted a green carpet over the plains of the West which effectively protected the soil from the ever-blowing winds. The buffalo and antelope fed upon but also manured and composted the grasses of the Plains. The inevitable result of tearing up the turf from the Plains, whether by ancient or recent man, has been the loss of the fertile top soil by wind erosion. Here is a dramatic presentation of a world problem. It is a grim warning to all who would deviate from the ways of Nature. To the top soil we must cling for health and for our very life.

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WRITE FOR CATALOG

ORGANIC vs. CHEMICAL FERTILIZERS

October 6, 1947.

I thank you for your letter in reply to my inquiry concerning the use of green material for fertilizer. My father turned the buckwheat under only about three inches, so that the plants were barely covered up; then he sowed the winter rye and disced this crop under the following spring in preparing the soil for the summer crop. He obtained amazing results.

Last year I planted 87 tomato plants on land that had received commercial fertilizers for years, and threw away about 35 bushels of tomatoes because they were unfit for use. This year, after using the two green manure crops as practiced by my father, I discarded only about 3 pecks of spoiled fruits. Accordingly, I feel that I have accomplished something when I speak of organic gardening. This year I proved that we must return to the Good Old Earth something more than what has been manufactured by Corporations who shut their ears to the organic methods.

Furthermore, this year I did not have to buy sprays as I was compelled to do last year and then lost most of

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my crop in spite of the poisonous sprays and doubtless because of the chemical fertilizers.

John H. Campbell,
Racine, Wisconsin.

—o—

COMPOST CONDITIONS KANSAS SOIL

October 13, 1947.

I would like to tell you how much I appreciate the results that I obtain from compost. Last spring I had three heaps amounting to about 50 wheelbarrow loads of compost. One heap covered about one-half of the potato ground. This compost was made of green matter, dry hay, chicken manure, and cow dung. The potatoes on the composted ground were larger and greener than plants on the uncomposted soil in the same plot. Also the potato tubers were larger, firmer, and had a smoother skin. This result should make a believer out of the most skeptical person.

I applied the other two heaps to the vegetable garden. I could work the ground immediately after a rain, while most of my neighbors had to wait a week or ten days before they could work their soil. They would watch me work, not believing that I could do it; yet when it turned dry as it can in Kansas, my ground would be damp underneath.

Roger V. Bezinque,
R. F. D. 4,
Pittsburg, Kansas.

—o—

GIANTS FROM COMPOST

September 9, 1947.

I am enclosing a clipping from our newspaper telling of the cabbage I grew organically and mulched with building paper.

The soil on my acre had been chemically fertilized for a number of years before I bought it. I found most of this soil burned out. For my plantings, I prepared the soil by digging trenches then filling them with leaves,

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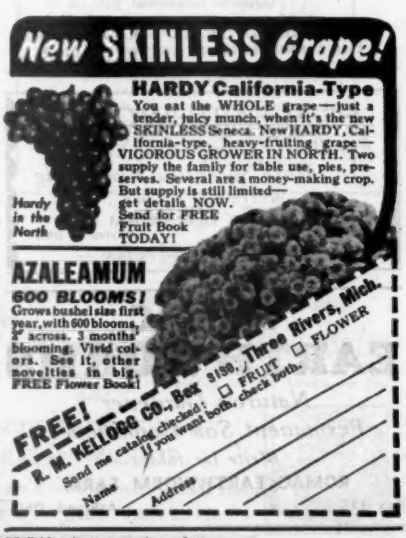
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then compost. On top of the soil I laid a strip of building paper fifty feet long and cut in it 3 inch holes at intervals of 3 feet. In these holes I planted my cabbage seedlings which I grew from seed in a hotbed well prepared with leafmold.

Most of the cabbage plants grown thus fertilized with compost and mulched with building paper averaged from 9 to 18 pounds but one weighed 25½ pounds. I have corn 13½ feet high, some plants having as many as 8 ears. I grew pumpkins weighing 41 pounds and over. I can't say too much about organic gardening. I have not used sprays this year either.

My health is so much improved since I eat only the fruits and vegetables grown in my composted soil. I can hardly believe that compost grown foods could make such a difference.

I have one peach tree on my place that has been badly affected with leaf curl. This spring I composted all my trees . Although this peach tree leaved out with the worst case of leaf curl I have ever seen, the diseased leaves fell from the tree in a relatively short time and new and entirely healthy leaves appeared. This year my trees had larger and more perfect fruit than in any previous year. I could go on and on with my experiences in organic gardening but will write again at some future time.

George W. Dewing,
Ojai, California.

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Joeneva Farms, shown above, uses the product of their Royer C-Jr. to develop real soil-building earthworms at their Arlington Heights, Illinois, hatchery. Where earthworms thrive, plants thrive—you gardeners, too, can blend, mix, shred and aerate 1 to 3 cubic yards of organic materials per hour with this Junior model. Eliminates drudgery . . . assures the best. Larger models available. Send for Bulletin 46.

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KINDS OF ACTIVATORS

Q. What is meant by an activator? What kinds of activators are available for use in making compost?

R. A., Sunbury, Pa.

A. An activator is an agent which brings about the decomposition of plant and animal wastes in the compost heap. Two types of activators may be recognized, 1) biological activators, and 2) chemical activators. Biological activators represent cultures of organisms of decay which bring about the decomposition of the materials in the compost heap by biological processes. A chemical activator consists of chemicals which break the organic materials down by chemical processes. Perhaps the difference between biological decomposition and chemical decomposition can be illustrated by what happens to a pile of leaves. If put on piles which are well supplied with moisture and air, the leaves will be decomposed by organisms of decay and the result is leafmold or humus. But if the leaves are dried or burned, they are reduced to a small pile of ashes, and this is chemical decomposition. In the compost

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heap;—with a biological activator you get humus as a result of decomposition produced by organisms of decay, with a chemical activator you get humus as a result of decomposition produced in part by chemicals.

—o—

NOVEMBER FOR COMPOSTING

Q. Please advise, if possible by return mail, if I can begin a compost heap in November. Is this too late in the year?

J. C. R., St. Louis, Mo.

A. November is an excellent month for building compost heaps because at no time of the year are plant materials more abundant for this purpose:—garden wastes, autumnal leaves, roadside weeds, wastes from food-processing plants, and other plant materials are easy to obtain at this time of year. Also by making the compost heaps now, the compost will be ready for use at spring garden making time.

—o—

CONSERVING AUTUMNAL LEAVES FOR COMPOSTING

Q. How may autumnal leaves be conserved for making compost during the winter months as fresh manure becomes available?

F. R. S., Lewistown, N. Y.

A. A satisfactory method of collecting and storing leaves in a minimum space is to rake them on piles and pack them in burlap bags or other containers. It is surprising how many leaves can be packed in a limited space.

—o—

EARTHWORMS FOR CHICKENS

Q. Are earthworms beneficial to chickens? I keep my chicken yard moist and turn over a few rows every day, and the number of angle worms I find is amazing. Everyone says they never saw chickens grow like mine.

C. D. V., Ligonier, Ind.

A. Earthworms are an excellent source of proteins to supplement the

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grains grown and used by organic farmers. In this way all of the food eaten by the chickens is organic food.

—o—

WOODS SOIL FOR THE LAWN

Q. I am surrounded by woods and have access to all the woods soil I want. Can this soil be used for fertilizing agricultural land?

N. A. P., Roanoke, Va.

A. Woods soil is nature's compost and can be used for improving the physical texture and the chemical content of agricultural land. For acid loving plants, it can be used as collected without further treatment. For plants which require a neutral or slightly alkaline soil, it will be necessary to use lime with the woods soil to neutralize its acidity. In collecting woods soil not too much should be taken from one place.

—o—

HOW TO CONTROL MOLES

Q. Can you tell me the best method for controlling moles that dig tunnels in my lawn?

W. M., Varnell, Ga.

A. The very best method of controlling moles is to trap them. Their presence in the soil is a good indication that the soil is fertile and probably is inhabited with earthworms. Do not use poisons to control moles or any other organism that makes a nuisance of itself.

—o—

HOT CAPS

Q. What are hot caps and how are they used?

J. H., Rockford, Ill.

A. Hot caps are paper cones to be placed over plants in early spring to protect them from low temperatures at night and on cold days. A hot cap is placed over each plant which serves as a kind of greenhouse while the seed-

lings are young and tender and the weather is unsettled.

—o—

DIATOMACEOUS EARTH

Q. What is the white powder used by cleaners of clothes to filter their cleaning fluid?

B. G. Y., Ft. Myers, Fla.

A. The filtering material used by clothes cleaners to filter cleaning fluids is diatomaceous earth. This is made up of billions of siliceous shells of microscopically small aquatic algae known as diatoms and described briefly in the article Botany for Gardeners in this issue of this magazine.

—o—

FENUGREK

Q. Do you have any information on Fenugrek? It surely makes a wonderful tea.

C. C. H., East Rochester, N. Y.

A. Fenugrek is a native of Southern Europe. This may be grown about like any other legume. A short article on Fenugrek has appeared in the December number of this magazine.

—o—

ROTTED WOOD AND NEEDLES OF PINE FOR MULCHING

Q. Are rotted pine wood and decomposed pine needles good for mulching plants?

J. H. C., Los Angeles, Calif.

A. Rotted pine wood and pine needles are organic materials with an acid reaction. These materials are excellent for mulching such acid loving plants as azaleas, camellias, and rhododendrons, and heath or ericaceous plants in general. Before being used for plants that require a neutral or slightly alkaline soil, these materials should be composted with lime to neutralize the acids.

—o—

WEED KILLERS

Q. I have read in numerous magazines and in literature about weed killers, but have always considered them contrary to the principles of

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organic gardening. Am I correct in this view?

S. C. T., Atlanta, Ga.

A. We advise against the use of weed killers because they kill other things as well, especially the soil organisms. We must remember that the soil is inhabited by millions of beneficial organisms. Weed killers upset the balances in nature.

—o—

COMPOST FOR THE LAWN

Q. Would you kindly tell me what is the best method in applying compost to an established lawn?

H. D. W., Athol, Mass.

A. Use compost that is slightly acid, i.e. compost made without adding lime to the heap. Make the compost fine by grinding, by chopping it with a hoe or otherwise and pass it through a quarter-inch sieve. The sieved compost should then be spread over the surface of the lawn to the thickness of a half inch or so and raked into the soil. Bare spots should be reseeded. This treatment will make the lawn grow so vigorously that weeds, including quack grass, will be crowded out. By fertilizing the lawn in the fall with compost, the grass will get an early start in the spring and occupy the ground so completely that quack grass which spends the winter in the seed stage will not have a chance to grow.

—o—

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Q. Will not vegetables and flowers burn more quickly and badly in a hot dry summer as this one of 1947 in Southwest Oklahoma when compost is used than when it is not used? There is no water for irrigation.

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